

# THE ECHINODERM NEWSLETTER

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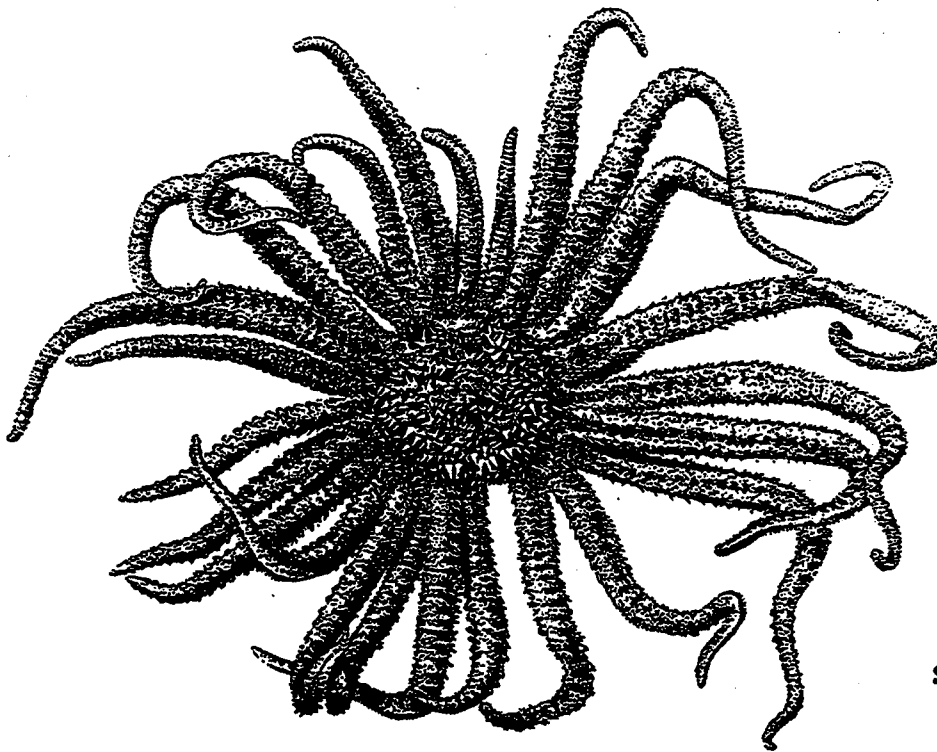
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The newsletter contains information concerning meetings and conferences, publications of interest to echinoderm biologists, titles of theses on echinoderms, and research interests, and addresses of echinoderm biologists. Individuals who desire to receive the newsletter should send their name, address and research interests to the editor.

The newsletter is not intended to be a part of the scientific literature and should not be cited, abstracted, or reprinted as a published document.



Sladen 1889

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☆☆☆☆☆ CURRENT RESEARCH ☆☆☆☆☆

ABREU, MERCEDES - Systematics and reference collections of macroalgae and marine invertebrates from the Archipelago Jardines de la Reina; General evaluation of the ecological state of the Cuban reefs and monitoring of the Cuban regional state of CARICOMP; studying echinoderms of Caribbean Mexico and the coasts of Cuba.

ADAMS, NIKKI - I'm examining the cellular and molecular targets of UVR in sea urchin eggs and embryos that lead to UV-induced delays in division and morphological abnormalities such as packed blastulae and exogastrulation.

ADDISON, JASON A. - Population genetics of *Strongylocentrotus drobachiensis*.

AGATSUMA, YUKIO - Ecological studies on population dynamics of the sea urchin *Hemicentrotus pulcherrimus*.

AHLGREN, MOLLY - Biology of the Red Sea Cucumber (*Parastichopus californicus*). Seasonal habitat use, population dynamics, role in processing organic matter in shallow subtidal sediments, diet and digestion, seasonal changes in body composition during visceral resorption and regeneration.

ALBI, YVONNE Z. - Working on Cretaceous echinods from the Santa Ana Mountains, southern California which have not been described before.

ALI, MOHAMED SAID M. - study of some Jurassic and Cretaceous echinoids of Sinai, Egypt.

ALLEN, JOHN A. - deep-sea benthos of the Atlantic.

ALLISON, WILLIAM R. - I am a coral reef ecologist, and so am generally interested in Echinoderms. I have however, a particular interest in all facets of the life and times of *Culcita* spp. I am looking into the taxonomy and ecology of the species in Maldives, with special interest in its feeding ecology; completing research on reef survey methods and the status of Maldivian reefs.

ALVA, VICTOR - trophic ecology of benthonic suspension organisms.

ALVAREZ, LEONARDO RAMON - Review of the Echinoderms of the Atlantic coast of Colombia.

ANDACHT, TRACY M. - studying the mechanism of dorsoventral polarity disruption and inhibition of fertilization envelope elevation by nickel chloride in the sea urchin embryo, *Lytechinus variegatus*.

ANDERSEN, AASMUND - study of chemically induced predator responses on *Strongylocentrotus drobachiensis*.

ANDERSON, EDWIN J. - Hierarchic cyclic stratigraphy of the Lower Cretaceous' Purbeckian' facies in Southern Spain-Dorset-French Jura.

ANDERSON, OWEN - commercial fisheries research and marine ecology; population biology of commercial species of sea urchins in New Zealand, and the collection and identification of shallow water and deep-sea

echinoderms.

ANDERSON, ROLAND C. - an escape action of the asteroid *Poraniopsis inflata* in response to other sea stars.

ARAKAKI, YUJI - Taxonomy of the sea urchin, *Echinometra mathaei* and *E. oblonga*.

ARCHER, JEFFREY E. - Culture of echinoderms - holothurians and echinoids. Culture of reef fish and invertebrates for the aquarium trade.

ARONSON, RICHARD B. - patterns of predation on echinoderms in time and space from the tropics to Antarctica.

ASHA, PAYIKAT - Breeding, seed production and sea-ranching of sea cucumber *Holothuria scabra*.

AUSICH, WILLIAM I. - early radiation and phylogeny of crinoids; crinoid classification; crinoid taphonomy; Lower Mississippian crinoid macroevolution.

BALSER, ELIZABETH J. - mechanisms of asexual reproduction in echinoderm larvae.

BANGI, HELEN GRACE P. - culture and management of the sea urchin *Tripneustes gratilla*; pilot testing of sea urchin grow-out culture in Bolinao, Pangasinan, Philippines.

BARBOSA LEDESMA, ISRAEL FABRICIO - taxonomic study of Mexican sea urchin, particularly Family Cidaridae, species of *Hesperocidaris*.

BARTSCH, ILSE - epi- and endozoa of ophiuroids.

BASCH, LARRY V. - Ecological consequences of sea otter recolonization on nearshore benthic communities and resources in Glacier Bay, Alaska.

BAUER, JOHN C. - A morbid laboratory *Diadema antillarum* was recently discovered with flagellated protozoans in the coelomic fluid (along with phagocytic coelomocytes). Studies are now being conducted to culture the flagellates and to trace the route(s) of the infection which led to the mortality.

BAUMILLER, TOMASZ K. - ecology and functional morphology of recent isocrinids; taphonomy of arms and stalks of articulates and advanced cladids vs. other Paleozoic taxa; diversity of Permian and Triassic crinoids and effects of the P/T extinction; patterns of turnover and extinction of Paleozoic crinoids; ecology of *Seirocrinus*; borings in Paleozoic pelmatozoans.

BAZHIN, ALEXANDER - monitoring the condition of sea urchin populations (*Strongylocentrotus droebachiensis*, *S. polyacanthus*) along the Kamchatka peninsula shore.

BEAVER, HAROLD H. - structure and function of blastoid summit plates.

BECKER, JOHANN - marine invertebrates of Brazilian oceanic islands, including especially echinoderms.

BEGBIE, KIRSTEN M. - studies on the hyponeural nervous system of the brittlestar, *Ophiura ophiura*.

BELL, BRUCE M. - Edrioasteroids.



- BELL, MIKE - Trace fossils of ophiuroids and asteroids from Lower Cretaceous of Chile, South America. Evidence for Cretaceous echinoderm aggregation.
- BENAVIDES, MILENA - epifauna of the continental shelf of the Caribbean coast of Colombia (300 to 500 m) - (thesis in progress).
- BENTLEY, ANDREW C. - biology of the sand dollar, *Echinodiscus bisperforatus* along the southeastern coast of South Africa, encompassing growth, reproduction, genetics, larval biology etc.
- BERENTS, PENELOPE B. - Collection manager of Echinoderm collections.
- BERGEN, MARY - The Southern Bight Pilot Project - a survey of soft bottom benthic communities between 10 & 200 m between Point Conception, California and the Mexican border.
- BERTRAM, DOUGLAS F. - evolution and ecology of modes of development in echinoids.
- BIERMANN, CHRISTIANE H. - Population genetic structure in the circumantarctic sea urchin genus *Sterechinus*; Reproductive isolation and population genetics in the Strongylocentrotidae (Echinoidea); Camarodont phylogeny.
- BILLETT, DAVID S.M. - environmental impact on the deep sea; taxonomy of the genus *Mesothuria* (Holothuroidea).
- BIRENHEIDE, RUDIGER - Echinoderm aquaculture.
- BIRKELAND, CHARLES E. - coral reef management.
- BIRYUKOVA, INGA V. - chemoreception; chemosensory systems and its morphogenesis in the marine invertebrates.
- BLAKE, DANIEL B. - The Triassic asteroid *Trichasteropsis* (with H. Hagdorn); The Carboniferous asteroid *Compsaster*; Early stelleroids from Utah (with T. Guensburg, J. Sprinkle, C. Sumrall).
- BLUHM, HARTMUT - Holothuroidea as possible indicators for physical disturbance impacts in the deep sea.
- BOCKELIE, JOHAN F. - Rhombiferan cystoids, Scandanavia.
- BOCZAROWSKI, ANDRZEJ - Devonian Nonpelmatozoan Echinoderms (Ophiuroidea, Cyclocystoidea, Ophiocystioidea, Echinoidea, Holothuroidea) Mesozoic Nonpelmatozoan Echinoderms (Asteroidea, Ophiuroidea, Echinoidea, Holothuroidea) Triassic articulated ophiuroids from Poland.
- BONASORO, FRANCESCO - regeneration of crinoids.
- BORGES, MICHELA - Systematics and ecology of ophiuroids from southeastern Brazil.
- BORRERO, GIOMAR - Taxonomy and distribution of echinoderms on the continental shelf from 300- 500 meters depth between Punta Gloria and Cape Tiburon (Caribbean coast of Colombia).
- BORZONE, CARLOS A. - Matinhos sandy beach replenishment and its impact on the benthic macrofaunal

nearshore community; echinoderms of Parana's coastal waters, Brazil.

BOSCH, ISIDRO M. - UV effects on embryonic development of Antarctic and tropical echinoderms; Spawning periodicity of zebra mussels in New York's Finger Lakes.

BOUDOURESQUE, CHARLES F. - effect of the invasive introduced alga *Caulerpa taxifolia* on *Paracentrotus lividus*: population dynamics and diet; long term changes of *Paracentrotus lividus* (sea urchin) populations in a protected area and a non-protected area.

BOURGOIN, ALLAIN - studying the possibility of commercializing the green sea urchin *Strongylocentrotus drobachiensis* on the northeastern coast of New Brunswick.

BREGMAN, YURIY E. - Size-age structure and body growth studies of commercial sea urchins *Strongylocentrotus intermedius* and *S. nudus* at Japan Sea and Kuril Islands Coasts.

BRETON, GERARD - Tethysian Saccocomid Cretaceous crinoids; Asteroid phylogeny - Mesozoic - Europe, Africa.

BREY, THOMAS - Antarctic Echinoids: Diet, Growth. Antarctic Ophiuroids: Growth. Antarctic Asteroids: Diet, Population Dynamics.

BROGGER, MARTIN I. - Biodiversity of the South Atlantic Ocean invertebrates in the Buenos Aires province area; trophic ecology of primitive asteroids (*Astropecten* spp. and *Luidia* spp.)

BROWER, JAMES C. - Taxonomy, functional morphology, paleoecology, ontogeny and phylogeny of Ordovician crinoids and blastozoans from North America.

BUITRON-SANCHEZ, BLANCA E. - Cenozoic echinoderms (Stelleroidea and echinoidea) from Baja California, Mexico.

BUNDRICK, CARLA - Occurrence and distribution of *Amphiodia occidentalis* and brooding *Amphiodia* species; Amphiuroid systematics.

BURCH, BEATRICE L. - Working on foraminifera in gut of spatangoid echinoids of Hawaii (hopefully in the next spring with Rich Mooi).

BURNS, CASEY - Three possible new species of echinoids from the Eocene of Oregon at the Burke Museum in Seattle.

BUSSARAWIT, SOMCHAI - Taxonomic study of echinoderms from the Andaman Sea, west coast of Thailand.

BYRNE, MARIA - Life history evolution, echinoderm reproduction and development, ophiuroid functional morphology, echinoderm fisheries.

CALTAGIRONE, ANGELA - Sea urchin aquaculture.

CAMERON, R. ANDREW - A promoter trap strategy for finding embryonic gene regulatory regions in the sea urchin genome; The spatial expression of known patterning genes in sea urchin larval development; A

microsatellite analysis of homozygosity in an inbred line of sea urchins.

CAMPAGNA, SOPHIE - Stock assessment of the sea cucumber *Parastichopus californicus* in British Columbia. Field studies to test harvest rates and estimate biomass.

CAMPBELL, ALAN - Fisheries stock assessment, ecology of red sea urchins in British Columbia, Canada.

CAMPBELL, ANDREW C. - Coral reef/ echinoid relations; Taxonomy, systematics and ecology of diadematid echinoids; Distance chemoreception in echinoids and asteroids; Bioerosion by echinoids; Sea turtles.

CAMPBELL, DAVID B. - Feeding behavior of *Asterias*.

CAMPOS-CREASEY, LUCIA S. - Taxonomy of holothurians from the northeast coast of Brazil.

CANDIA-CARNEVAL, M. DANIELA - Crinoid arm regeneration; structure, physiology and biomechanics of complex musculo-skeletal systems (echinoid lantern, ophiuroid masticatory apparatus).

CAREY JR, ANDREW G. - Ecology of mega-epifauna of Mendocino Ridge and papers on Arctic and deep-sea benthos.

CASTRO, JOAO - Human predation on SW Portugal rocky shores: activities and impacts; Ecology of SW Portugal rocky shores: macrobenthic populations and communities.

CHAO, SHYH-MIN - Population dynamics of the shallow-water holothurians of Taiwan; systematics of the echinoderms from Taiwan.

CHAVARRO, SONIA BEJARANO - Reef ophiuroid ecology, habitat preferences, species occupying sponges.

CHEN, CHANG-PO - Ontogenesis of skeletal plate patterns, gonad, and gonapores in the progenerative *Sinaechinocyamus mai*.

CHENUIL, ANNE - Consequences of developmental mode on the planctotrophic larva in spatangoids: from population biology to phylogenesis.

CHIA, FU-SHIANG - retired - writing articles on environmental issues, particularly on marine environment.

CHICCA, ANGIE - Volunteer collector for Birch Aquarium at Scripps Institution of Oceanography.

CLARK, ROGER N. - Asteroidea of the Aleutian Islands, Alaska (especially genera: *Hippasteria*, *Solaster* and *Pteraster*); Echinoderms of Alaska; Deepsea echinoderms of the North American Pacific Coast (200-5000 m).

CLEMENTS, LEE ANN J. - Effects of flow rate on skeletal regeneration in the burrowing brittlestar *Ophiophragmus filograneus*; gene expression during arm regeneration in two infaunal brittlestars: *Microphiopholis gracillima* and *Ophiophragmus filograneus*; larval toxicology - the effects of sublethal Zn exposure on larvae of the sea urchin *Lytechinus variegatus*.

CLOUSE, RONALD M. - Taxonomy and behavior of *Bohadschia marmorata* and *B. bivittata* (Holothuroidea) from Micronesia.

- COLON-JONES, D. ELIZABETH - Rearing *Diadema* larvae; rearing coral larvae; studying the sediment regime on Biscayne National Park reefs; examining calcification rates of corals.
- CONAND, CHANTAL - Holothurian fisheries (Indian Ocean, Madagascar); asexual reproduction in sea cucumbers; population biology of the sea urchin *Colobocentrotus atratus*; biodiversity of reef echinoderms (La Reunion).
- COSTELLO, MARK J. - Developing a European Register of Marine Species (details at web site [erms.biol.soton.ac.uk](http://erms.biol.soton.ac.uk)).
- CREASER, EDWIN P. - Green sea urchin CPUE and management Maine.
- CRUMP, ROBIN G. - Asteroid development and ecology.
- CUNHA DE JESUS, DORA MARIA - Seaweed harvest impact in echinoderm populations of SW coast of Portugal.
- DAFNI, JACOB M. - Echinoid growth.
- DALBY, JR., JAMES E. - Growth of arctic ophiuroids in relation to ice cover.
- DALGLEISH, CLAIRE - Our company is currently working with macrobenthos sampled from the North East Atlantic margin, mainly in the Faroe-Shetland channel as part of environmental monitoring programmes within the oil and gas industry, UK.  
[www.ert.co.uk](http://www.ert.co.uk) - Environment and Resource Technology's Homepage offering an introduction to a wide range of inhouse environmental capabilities
- DAVOULT, DOMINIQUE - Ecology and functioning (carbon and nitrogen fluxes at the water-sediment interface) in coastal benthic communities with special reference to a dominant species, the ophiuroid *Ophiothrix fragilis* (Abildgaard); interactions between physics (hydrodynamism) and biology (suspension-feeding behaviour) for metabolism and recruitment.
- DAYTON, PAUL K. - Benthic ecology.
- DE RIDDER, CHANTAL J.M. - Symbioses in echinoids; food and feeding mechanisms in echinoids; taxonomy and biogeography of Antarctic echinoids.
- DE WIT, WALTER M.J. - Fossil echinoderms in fluvial and ice-age deposits of Holland.
- DEAN, JULIETTE - Ordovician divergence of asteroids and ophiuroids.
- DEARBORN, JOHN H. - Identification manual for NW Atlantic ophiuroids; Gulf of Maine ophiuroid ecology; crinoids and ophiuroids of the Antarctic; functional morphology of ophiuroid podia.
- DETWILER, PAUL - Population dynamics of echinoids, phenotypic plasticity and life history variation among ecotypes, echinoid/coral interactions, and microbial flora associated with echinoids.
- DEVIN, MICHAEL G. - Developing commercial sea urchin culture techniques (Aquaculture).

- DEWAEL, YANNICK - Nervous control of the luminescence on three luminous brittlestars. This year, I will try to patch-clamp on ophiurid luminous cells.
- DIEHL, WALTER J. - Effects of environmental stress on multilocus heterozygosity-growth relationships in invertebrates.
- DOBSON, WILLIAM E. - Population biology of *Ophiura sarsi* on continental slope off North Carolina; use of skeletal growth bands in ophiuroid ossicles as biological markers for sublethal predation and population ecology experiments.
- DOLMATOV, IGOR Y. - Regeneration mechanisms and their changes during individual development of echinoderms.
- DOMINGUEZ, PATRICIO - Working on early echinoderms, especially Cambrian and Ordovician Pelmatozoans and Carpoids from Spain.
- DONOVAN, STEPHEN K. - Fossil crinoids and echinoids of Barbados and the Grenadines - paper in preparation on Tertiary crinoids from Carriacou and Barbados (with C.J. Veltkamp); paper in preparation on systematics of Pleistocene echinoids from Barbados; fieldwork in Carriacou planned for summer 2000. British Ordovician crinoids - describing exceptionally well-preserved crinoids from the Middle Ordovician of the Shelve Inlier (with W. Fone and D.N. Lewis). Ordovician decapitated crinoids - paper in preparation (with D. Schmidt).
- DORNBOS, STEPHEN Q. - Paleoecology of helicoplacoids and other Cambrian suspension-feeding echinoderms (for Masters Thesis).
- DRUMM, DARRIN - Researching traditional holothurian fishery in the Cook Islands.
- DRUMMOND, ANNE E. - intra and interspecific agnostic behaviour in echinoids; wave action and consequences for *E. mathaei*, *S. variolaris*, *D. savignyi*.
- DUPONT, SAMUEL - Bioluminescence in *Amphipholis squamata* (Echinodermata: Ophiuroidea): a suitable model for studying microevolution (for PhD thesis).
- EAGLE, MIKE - Mesozoic Crinoidea of New Zealand; Cenozoic Comatulida of New Zealand; 3. Fossil echinoderms of New Zealand.
- EBERT, THOMAS A. - 1) Finishing work on growth and mortality of red and purple sea urchins (*Strongylocentrotus franciscanus* and *S. purpuratus*) along the west coast of North America. 2) The life-history consequences of the evolutionary timing of different modes of reproduction in ophiuroids.
- EBLE, GUNTHER J. - Evolutionary dynamics in disasteroids, holasteroids and spatangoids; post-metamorphic spatangoid development; phylogeny of disasteroids, early holasteroids and early spatangoids.
- EEKELERS, DIRK - Biodiversity and distribution of asteroids on the coral reefs of Kenya.
- ELISEIKINA, MARINA G. - Functions of echinoderms lectins; physiological and reparative regeneration of echinoderm internal organs.

- ELLERS, OLAF W. - Growth of sand dollar teeth; catch collagen.
- EMLET, RICHARD B. - Functional morphology of echinoderm larval evolution of echinoid life histories and development.
- ENTRAMBASAGUAS, LAURA DE - Biology, ecology and biogeography of the Cape Verde Island's echinoderms (including taxonomy).
- ETNIER, SHELLEY - Comatulid crinoids.
- ETTENSCHNIG, FRANK R. - Middle Ordovician edrioasteroid firmground; Paleozoic stemless crinoids; Taxonomy, ecology, and functional morphology of the pelagic crinoid *Saccocoma*.
- EVDOKIMOV, VLADIMIR V. - Influence of ecological conditions on sea urchins ontogenesis in coastal communities.
- FARMANFARMAIAN, A. VERDI - Growth hormone and nitrogen retention.
- FAY, ROBERT O. - Ovachita Belt bibliography.
- FEDER, HOWARD M. - The deep benthic environment in Port Valdez, Prince William Sound, Alaska; the feeding biology of the sea star *Pycnopodia helianthoides* in Prince William Sound, Alaska; the deep benthos in Prince William sound 16 months after the Exxon Valdez oil spill; the macrofauna (infauna and epifauna--which includes large numbers of sea-star species) in the southeastern Chukchi Sea.
- FERAL, JEAN-PIERRE - Structure of habitat and dispersal strategies; effects of developmental modes on spatial and genetic structuring and on evolutionary processes (mainly in echinoids - annelids and molluscs also used).
- FERGUSON, JOHN C. - Madreporite functions and water volume relationships in echinoderms - currently on echinoids and holothuroids.
- FERNANDEZ, CATHERINE - Reproduction and population dynamic in lagoonal environment.
- FERRAZ, ROGERIO R. - Scientific support to management of the small invertebrate resources of the Azores (RIVA).
- FERRIER, DREW - Ophiuroid ecology (distribution, feeding and behavior).
- FLAMMANG, PATRICK - Adhesion in echinoderms: An integrated study - biomechanical, morphological, molecular - of tube foot temporary adhesion, Cuvierian tubule adhesion, and larval fixation.
- FOLLOSCO, MINDA P. - Artificial culture of economically important sea cucumber.
- FONTANELLA, FRANK M. - A comparison of ossicle arrangement and morphology in *Echinaster sentus*, *E. spinulosus*, *E. paucispinus* from the western Atlantic and Gulf of Mexico and a yet undescribed species from the shallow waters from the Gulf of Mexico.
- FORET, TIMOTHY W. - Regeneration rates of *Luidia* in the field and the energetics of regenerative

development; have begun thesis examining the prevalence of subcuticular bacteria in Gulf Coast (Florida) asteroids.

FOSTER, MERRILL W. - Ordovician echinoderms from western Virginia; Atlantic Ocean brachiopods; Antarctic and subAntarctic brachiopods; paleobiology of Pennsylvanian invertebrates in Illinois.

FOX, DAVID J. - Analysis of articulation in the arms of *Ophiocoma echinata* and *Ophiocoma wendti*.

FRANKEL, EDGAR - Coral reef lagoon sedimentation; coastal lakes, N.S.W.; volcanic ash - Mediterranean Sea; tectonics - eastern Mediterranean sea (ODP160)

FREEMAN, STEVEN M. - Relationships between macro-epibenthic faunas and the seabed. Mapping benthic distributions using acoustic ground discrimination systems and GIS. Patterns in the geographical distribution of Echinoderms and their association with habitat complexity.

FRONTANA URIBE, SARITA CLAUDIA - Taxonomic and distributional study of invertebrates from Clipperton Island, including echinoderms.

FRYE, BRIAN - Morphometrics project focussing on the sand dollars *Encope borealis* and *Encope californica*.

FUJITA, TOSHIHIKO - biology of *Coscinasterias acutispina*; ecology of Recent and fossil *Ophiura sarsii*; ophiuroid's vertebrae (morphology, age determination); taxonomy of ophiuroids and asteroids in Japanese and tropical Pacific waters; biology of *Diadema* in coral reef area; investigation and re-examination of Ludwig Doderlein's collection from Japan.

FUKUYAMA, ALLAN K. - Looking at recovery of intertidal invertebrates in Prince William Sound, Alaska following the 1989 Exxon Valdez oil spill and am particularly interested in molluscan and echinoderm assemblages and the contrast in recovery patterns between areas that were treated with hot-water, high pressure treatment with areas that were oiled and untreated.

GAGE, JOHN D. - Deep-sea biology: shelf-edge benthic fluxes, and sediment community dynamics; deep-sea brittle star growth, spatial distribution and demographic modelling.

GAGNON, JEAN-MARC - Bioturbation by and foraging behaviour of deepwater echinoderms: observations in mesocosms.

GALLEMI, JAUME - Cretaceous echinoids (Tethyan - worldwide); systematics, biostratigraphy and palaeoecology.

GALLEY, ELIZABETH - Reproductive responses of bathyal Antarctic echinoderms to the seasonal flux of surface derived phytodetritus.

GANDOLFI, SILVIA MARIA - Benthic community structure and feeding behavior of asteroids for a PhD program at the University of Sao Paulo, Brazil.

GARRISON, ROBERT D. - Designing and building a *Paracentrotus lividus* aquaculture research facility in Sardinia, Italy for a behavior, aquaculture and fishery enhancement program.

GEBRUK, ANDREY V. - Deep-sea holothurians (order Elasipodida and, in part, Fam. Synallactidae).

- GENTIL, FRANCK A. - Population dynamics of ophiuroid species in soft-bottom community of the English Channel.
- GEORGE, SOPHIE B. - Maternal effects on larval growth and development of echinoderms; morphological and behavioral responses of echinoderm larvae to salinity gradients.
- GIBBS, BARBARA R. - Working on benthic sampling projects in the Florida Keys, Dry Tortugas, the northern Gulf of Mexico, and the Atlantic and Pacific coasts.
- GIBSON, MICHAEL A. - Epibiont paleoecology of middle Paleozoic fossils; Cretaceous paleoecology; Taphonomy of Devonian fossils from Tennessee.
- GIL CID, MARIA DOLORES - Cambrian and Ordovician echinoderms and trilobites from Spain; palaeological aspects, morphology and function.
- GINANOVA, TALIA T. - Muscle regeneration in holothurians.
- GIRASPY, BENI - Culture of sea cucumber.
- GIUDICE, GIOVANNI - Regulation of heat shock protein (hsp) synthesis in sea urchin embryos; apoptosis in sea urchin development; regulation of ribosomal RNA synthesis in sea urchin (*Paracentrotus lividus*) development.
- GIULIANO, LAURA - Studying sea urchin interspecific relationships. Particularly, I am interested in symbiotic and/or pathogenic bacteria colonizing the sea urchin (with special emphasis on *Paracentrotus lividus*, means species in the Mediterranean Sea), and any other kind of direct-indirect relations between bacteria and sea urchins (food during larval period, etc.).
- GLENN, KRITON C. - Biodiversity on the NW Shelf of Australia in conjunction with AIMS Environment Australia. Looking at the species and populations of the targeted holothurians at Ashmore Reef and Cartier Islet, two of the MPAs on the NW Shelf of Australia.
- GLUCHOWSKI, EDWARD L. - Fammenian crinoids of Poland. Muschelkalk crinoids in the Middle European Basin.
- GOGGIN, LOUISE C. - Biological control of the northern Pacific seastar; *Asterias amurensis* in Australian waters.
- GOLDBERG, ARTHUR S. - Investigating antiarthritic properties of echinoderms.
- GOLDSCHMID, ALFRED - Excretory function of axial organ; coelothel of the inner channel system in the echinoid axial organ (*Paracentrotus lividus*, *Sphaerechinus granularis*) and of the ophiuroid *Ophioderma longicauda* bears Podocytes; exchange between inner haemal fluid and external coelomic fluid; further exchange of axial coelomic fluid and seawater via the madreporic channels.
- GONGADZE, GURAM - Late Cretaceous and Paleogene echinoids of the Caucasus (classification, paleobiogeography, stratigraphy).
- GONZALEZ, DUNIA NATALIA - Studying echinoderms collected during the expedition



CIOH-INVEMAR-SMITHSONIAN 1995.

GOODING, RICHARD U. - Animals associated with Caribbean diadematids; animals associated with diadematid echinoids, worldwide.

GORCHAKOV, IGOR A. - Studying *Asterias rubens* and other sea stars intraspecific relationships in the subpopulation of Northern Atlantic on different integrative levels. Specie boundaries and population structure.

GRABOWSKY-KAALA, GAIL L. - Albatross recolonization project via the Audubon Society and HI Dept. of Fish and Wildlife.

GREENSTEIN, BENJAMIN J. - Taphonomy of crown-of-thorns starfish; comparative taphonomy of caribbean reefs; mode of formation of Pliocene shell beds.

GREENWOOD, AMY - Reproductive cycle of *Asterina phylactica*; Population dynamics, brooding success and juvenile growth rates of *A. phylactica* in Lough Hyne; Seasonality of echinoderm plankton; Fertilization kinetics in *Marthasterias glacialis*.

GROSJEAN, PHILIPPE - Land-based close cycle cultivation of *Paracentrotus lividus*. Size distribution and somatic growth of *P. lividus*, and its model.

GROVES, CATHY - *Heliaster* biogeography and systematics.

GUENSBURG, THOMAS E. - Edrioasteroids, early crinoids, paleoecology of echinoderms.

GUERRAZZI, MARIA C. - Natural history and the feeding behavior of the starfish *Echinaster brasiliensis*.

GUILLOU, MONIQUE - REPRODUCTION/RECRUITMENT: responses of sea-urchin population to environmental changes; BIODIVERSITY: seaweed-urchin interaction .

GURREA, ISIDRO - Echinoids from the Cretaceous and Cenozoic age, Mediterranean region (specifically Western Europe).

GUTT, JULIAN - Disturbance of polar benthic communities.

HADEL, VALERIA FLORA - Biology and ecology of echinoderms.

HAGEN, NILS T. - Sea urchin outbreak dynamics: ecological interactions in a macroparasite/sea urchin/kelp forest system. Echiniculture/closed cycle cultivation of sea urchins: broodstock management, photoperiodic control of gametogenesis, growth, feeding, design of cultivation equipment.

HAMEL, JEAN-FRANCOIS - I am currently working on the ecology of juveniles and adults of the tropical sea cucumber *Holothuria scabra* in the Solomon Islands, and on the northern sea cucumber *Cucumaria frondosa* in the St. Lawrence Gulf and Estuary, eastern Canada. My main fields of research include chemical ecology, reproductive biology, spawning, settlement and daily cycles (movement, feeding, etc.).

HAMMER, HUGH - Sea urchin growth and development.

HAMZA HASSAN, MOHAMED - Ecology and biology of echinoderms from Gulf of Suez - Red Sea.

HAND, CLAUDIA - Conducting stock assessments and biological studies for our local west coast species of sea cucumber, *Parastichopus californicus*, distribution, abundance and productivity.

HARPER, FIONA M. - Population genetics and hybridization of *Asterias rubens* and *A. forbesi*. *Asterias* phylogenetics.

HAUDE, REIMUND - Stratigraphy and constructional morphology of scyphocrinoids; Devonian and Carboniferous holothuroids; Lower Devonian echinoderms of Argentina.

HAVARDSSON, BJORGOLFUR - The effect of caroteins in feed and environmental temperature on the gonad color and gonad development of the sea urchin *Strongylocentrotus drobachiensis* (Mueller, 1776). The purpose of the experiment is to develop feed suitable for controlling the quality of the urchin gonad in echinoculture.

HAY, MARK - 1) National Undersea Research Center (NOAA) "Direct and Indirect Effects of Temperate Reef Herbivores on Benthic Community Structure and on How This Affects Reef Fish Recruitment and Habitat Use". 2) The National Geographic Society. "Ecological and Biochemical Consequences of Seaweed Spawning on Coral Reefs" (K. Clifton and M.E. Hay).

3) New Zealand Foundation for Research, Science, and Technology. "Causes and Consequences of Intraspecific Variation in Seaweed Chemical Defenses" (National Science Foundation. "Quantitative Aspects of Prey Chemical Defenses").

HEINZELLER, THOMAS E. - Comparative, mainly neuroanatomical, morphology (TEM, histochem.) of crinoids with special attention to milleri-, bourgeti- and cyrtocrinids; entoparasitic myzostomids of crinoids, mutual effects on host and parasite on an ultrastructural basis.

HENDLER, GORDON - Behavior and functional morphology of deep-sea ophiuroids; taxonomy of Okinawan ophiuroids (with S. Irimura); systematics and natural history of eastern Pacific ophiuroids.

HERDENDORF, CHARLES E. - Invertebrate fauna associated with deep-sea (>2000 m) shipwrecks; invertebrate fauna of New Zealand (North Island) estuaries and tidal flats; brisingid fauna of North Atlantic Ocean; echinoid (esp. sand dollars) invasion of New Zealand estuaries following diversion of freshwater inflow.

HERRINGSHAW, LIAM - Taxonomic and palaeobiological revision of Silurian asteroids, notably those from the Much Wenlock Limestone Formation of the Midlands and Welsh Borders. Also studying a problematic new species of crinoid from the same horizon.

HESS, HANS - New starfish from the Middle Jurassic (Bajocian) of northern Switzerland; Crinoid ossicles from the Lower Jurassic (Pliensbachian) of Arzo, Switzerland; Remains of Saccocomids from the Upper Jurassic of Germany (Sieverts-Doreck collection, on loan from Stuttgart Museum).

HEUER, ARTHUR - Microstructure and mechanical properties of mollusc shells; Regeneration of mollusc shells; In vitro mineralization of CaCO<sub>3</sub> in the presence of proteins extracted from mollusc shells.

HICKMAN, JR., CLEVELAND P. - Development of field guides for the identification of Galapagos marine invertebrate life.

HIGHSMITH, RAYMOND C. - Intertidal studies in Cook Inlet, Alaska.

- HILBUN, NANCY L. - Echinoderms of Yucatan Peninsula, Mexico for masters thesis.
- HILL, ROBERT B. - Composition of mechanical properties of sea cucumber muscle and connective tissue.
- HOBERG, MAX K. - Investigating the feeding biology of the sea star *Pycnopodia helianthoides* from eelgrass habitats in oiled and reference sites from Prince William Sound following the Exxon Valdez oil spill.
- HODGSON, ALAN N. - Spermatozoan morphology of *Patiriella*.
- HOFFMAN, JENNIFER - Interactive effects of ultraviolet radiation and temperature in echinoid embryos; variations in UV sensitivity among echinoid species and populations; effects of and defenses against UV in echinoid embryos.
- HOLTERHOFF, PETER F. - Late Paleozoic crinoid paleoecology and systematics; P-Tr extinction and eradication of the Crinoidea.
- HOOPER, ROBERT G. - Aquaculture of *Strongylocentrotus drobachiensis*.
- HOSHI, MOTONORI - Induction of acrosome reaction in starfish.
- HOTCHKISS, FREDERICK H.C. - Echinoderm pentamerism; teratology of sea stars; Paleozoic ophiuroid morphology, evolution and classification; isolated ophiuroid vertebrae and ossicles, Devonian, Bohemia (with Petr and Prokop); new Canadian finds of Ordovician stelleroids (with D.M. Rudkin); ophiuroids from Upper Windsor Group, Mississippian, Nova Scotia (with P. von Bitter).
- HOTTENROTT, SUSAN - Currently finishing a systematic revision and phylogenetic analysis of the ophiuroid family Ophiolepididae and revision of the genus *Ophiomusium*.
- HOWELL, KERRY - The ecology of deep sea asteroids including reproduction, zonation, abundance, distribution, diet and population genetics.
- HUNTER, MARGARET A. - Maine green sea urchin fishery monitoring and assessment.
- ILAN, MICHA - The study of sponge chemical (and structural) defenses against echinoderm predators; echinoderms which live in association with sponges; the impact of coral reef sea urchins on corals recruitment.
- IRIMURA, SEIICHI - Taxonomic study of Ophiuroidea based on the forms of vertebrae; SEM observation on disk granules of Ophiuroidea.
- ISHIDA, YOSHIKI - Taxonomy of Mesozoic and Cenozoic ophiuroids. Escape behavior and postures of extant and fossil ophiuroids after burial.
- IVY, W. GRISILDA - Seed production and sea ranching of sea cucumbers.
- JABLONSKI, DAVID - Onshore-offshore and latitudinal patterns in the origins of higher taxa, and their subsequent shifts in environmental and latitudinal distribution; studying post-Paleozoic echinoids and stalked crinoids; studying mainly molluscan but some echinoid mass extinction and recovery patterns, especially at the Cretaceous-Tertiary boundary.

JACOBSEN, NANCY A. - Identification and logging of occurrences of invertebrates, vertebrates and geologic features in the Monterey Bay; working especially with asteroidea analysis (WWW images and information will be available in the near future).

JAECKLE, WILLIAM B. - Nutrient distribution among tissue in planktonic larvae of echinoderms; asexual reproduction by asteroid larvae; sites and mechanisms of nutrient assimilation by larvae.

JAGT, JOHN W.M. - Latest Cretaceous-early Palaeogene echinoderms (holothurians excepted) from type area of the Maastrichtian Stage; late Maastrichtian echinoderm- 'lagerstatte' with bourgueticrinine crinoids and ophiolopid and ophiacanthid ophiuroids; high-diversity ophiuroid faunas of Campanian and Maastrichtian age from northeast Germany (with M. Kutscher).

JAMES, DANIEL B. - Preparing a monograph on the holothurians of the seas around India.

JAMIESON, GLEN S. - Sea urchin abundance surveys; near-shore community population dynamics.

JANIES, DANIEL A. - Phylogenetic analyses of the evolution of development among asteroids.

JEFFERIES, RICHARD P. S. - The phylogenetic relations between chordates, echinoderms and hemichordates (calcichordate theory).

JEFFERY, CHARLOTTE H. - Maastrichtian and Palaeocene echinoids; larval strategy in recent and fossil Temnopleuroid echinoids.

JELL, PETER A. - Australian Palaeozoic echinoderms. Non-crinoid faunas of Australia, mainly asterozoans of Victoria but also including Mesozoic faunas and some Tertiary comatulids.

JOHNSEN, SONKE - Absorption spectra of echinoderm visual pigments.

JUNIO-MENEZ, ANNETTE R. - Culture and population genetics of marine invertebrates (sea urchin); development of mass culture techniques for *Tripneustes gratilla*.

JUNQUEIRA, ANDREA O.R. - Population dynamics of echinoids.

KAMMER, THOMAS W. - web page: <http://www.geo.wvu.edu/~kammer/welcome.htm>

KASYANOV, VLADIMIR L. - Cellular mechanisms of reproductive strategies of marine invertebrates.

KAWAUCHI, GISELE YUKIMI - Reproduction and dispersion - apodous holothurians.

KELLER, BRIAN D. - Echinoid ecology.

KELLEY, SCOTT L. - Cretaceous echinoids of Texas; Cretaceous comatulid crinoids of Texas.

KELLY, MAEVE S. - Feasibility of commercial echinoculture in Scotland (*Psammechinus miliaris*); echinoderm/subcuticular bacteria symbioses.

KERR, ALEXANDER M. - Ecology, character evolution, diversification and molecular systematics of aspidochirote holothuroids.

- KINJO, SONOKO - Evolution of skeletal morphology of larvae in the family Echinometridae (Echinoidea).
- KLINGER, THOMAS S. - Digestion in echinoids, asteroids, and holothuroids; population biology of tropical holothuroids; manufactured feeds suitable for the mariculture of echinoids.
- KNOTT, K. EMILY - I am working to produce a phylogeny of the Asterozoa using molecular data (DNA sequence from mitochondrial and nuclear genes). I am interested in larval asexual reproduction in asteroids and am comparing expression of developmental genes in clones to larvae developing from a fertilized egg.
- KOBAYASHI, NAOMASA - Marine pollution bioassay by using sea urchins; spawning periodicity of sea urchins; effects of marine pollution upon sea urchin gonads.
- KOGO, ICHIZO - Class Crinozoa - taxonomy.
- KRISHNARAJAH, PADMINI - Kinetic studies on carbohydrase enzyme of *Holothuria scabra*.
- KROH, ANDREAS - Danian (Paleocene) echinoids of Austria; Lower to Middle Miocene echinoids of Austria; Oligo-Miocene echinoids of the eastern Mediterranean.
- KYTE, MICHAEL A. - Ophiuroid (worldwide) and asteroid (NE Pacific) taxonomy and behavior; sea cucumber ecology.
- LAMBERT, PHILIP - Describing a new species of sea cucumber from soft sediment in shallow bays of Puget Sound. Revising sea star Handbook.
- LANDEIRA, ANA MARIA - Ca<sup>2+</sup> transport in sea cucumber smooth muscle.
- LANE, DAVID J.W. - The Echinodermata: a biological tool for the control and protection of marine benthic environments in Singapore waters.
- LANE, N. GARY - Completing three papers on Famennian (latest Devonian) crinoids from China, Britain, and Germany.
- LAWRENCE, JOHN M. - Characteristics of arm regeneration in starfish; nutrition and reproduction of sea urchins; life-history strategies of sea urchins and starfish.
- LE MENN, JEAN - Paleozoic North-African crinoids (calyx and dissociated columnals); benthic communities, polymorphs and medium to high frequencies cycles.
- LEE, YOUN-HO - Phylogenetic analysis of Korean east coast sea urchins; phylogenetic analysis of the antarctic sea urchin, *Sterechinus neumayeri*; analysis of spicule matrix protein gene expression in sea urchin embryos.
- LEFEBVRE, BERTRAND - Lower Palaeozoic (mainly Cambrian to Ordovician) primitive echinoderms (stylophorans, solutes, cinctans, ctenocystoids, eocrinoids) from northern margin of Gondwana (Bohemia, Spain, France, Morocco, Sardinia, Portugal) : anatomy, ecology, functional morphology, phylogeny, biostratigraphy, palaeogeography.
- LEISMAN, JULIANNE - Recruitment study of brittlestars in the Banana River; also, aspects of regeneration.

LELAND, AMANDA - My research addresses the question of how the green sea urchin affects coastal zone community structure in the Gulf of Maine via grazing pressure. Currently, I am working with sea urchin harvesters and the Dept of Marine Resources to determine if intense grazing pressure by large urchins can effectively reclaim suitable urchin habitat in areas that are depleted due to overharvesting. In addition, I am looking at grazing rates as a function of algae functional groups and for prominent local species as well as how grazing rates differ for urchins of different sizes and densities.

LESSER, MICHAEL P. - Molecular biology of photoperiod regulation of gametogenesis in sea urchins; Identification and transmission of bacterial symbionts in *Amphipholis squamata*.

LESSIOS, HARILAOS A. - Molecular biogeography of echinoids.

LEVERONE, JAY R. - Reproductive cycles of *Astropecten* and *Luidia* in lower Tampa Bay.

LEVIN, VALERY S. - Shallow water Holothuroidea; systematics, biology feeding and fisheries.

LEVITAN, DONALD R. - Ecological and evolutionary consequences of sperm limitation in echinoderms; echinoid grazing pressure in the Caribbean.

LHEKNIM, VACHIRA - I am identifying the echinoderm holdings in the Prince of Songkla University collections. Most of the specimens come from student field trips to the Gulf of Thailand and Andaman Sea.

LIAO, YULIN - Fauna Sinica: Echinodermata: Ophiuroidea.

LINDSTROM, DAWN - Amount of predation on *Ophiocoma echinata* through the use of tethering experiments.

LITVINOVA, NINA M. - Compiling a Catalogue Ophiuroidea of the Institute of Oceanology.

LORDSON, JINBERT - Seed production and sea ranching of sea cucumbers.

LOVELY, ERIC C. - Coexistence of hydroid predators in *Tubularia larynx* colonies.

LYONS, KERRY M. - Management of commercial Green Sea Urchin fishery - Maine

MACURDA, JR., D. BRADFORD - Mississippian crinoids.

MACZYNSKA, STEFANIA S. - Cretaceous and Tertiary echinoids particularly from Poland.

MAGSINO, RICHARD M. - Population genetics of the blue-coral reef starfish *Linckia laevigata*. The techniques used in the analysis of its population structure in relation to gene flow levels among populations in the South China Sea are the protein allozyme electrophoresis and RFLP (restriction fragment length polymorphism) analysis of PCR-amplified products of its mtDNA.

MAH, CHRISTOPHER - Current research focuses on the systematics and phylogeny of the Goniasteridae (Valvatida). This includes fossil and extant taxa. I hope to examine paleobathymetric patterns, as well as biogeography and other phylogenetic implications. I am also interested in the role of ontogeny and heterochrony in this group as it relates to other valvatidans (such as the oreasterids) as it relates to their evolution. Also: deep-sea biology and overall ecology of goniasterids are important as well.

MAHARAVO, JEAN - Study about proliferation of *Salmaciella erythraxis* in Ambaro Bay (Nosy-Be) Northwest coast of Madagascar.

MAIER, MARTA S. - Isolation and structural elucidation of secondary polar metabolites from echinoderms of the South Atlantic Ocean.

MAKRA, ATHENA - Arm regeneration in *Acrocnida brachiata* (Ophiuroidea); microdistribution of *A. brachiata* in Little Killary, west coast of Ireland bioturbation.

MALDONADO, ELISA - Study of ecology of deep-sea feather stars from the Bahamas (Smithsonian Institution with Dave Pawson); Study of ophiuroid parasites (Los Angeles County Natural History Museum with Gordon Hendler).

MALLEFET, JEROME C. - Luminescent ophiuroids; morphological, physiological, ecological aspects.

MANIKANDAN, K.P. - I am working in a research and development company in the Maldives (Mais Marine Seacucumber Research Centre, Bandaveri, Raa Atoll, Republic of Maldives - \*no postal service). We in our research centre are trying to commercialize seacucumber hatchery and growout. In our R&D Programme we have produced about 65,000 juveniles at 6% survival rate. From the start of my research career, I was fully interested in the embryology of sea cucumbers, particularly in *Holothuria scabra*. At present we have attained an increase in our survival rate from 5% to 15% without using sterilized seawater. We hope to increase it still more by using microbe-free-water. We are using different algal diets for its growth which to our excitement has affected greatly its metamorphosis and cycle duration. I am still carrying on my research by making seacucumber hatchery and culture a commercial one in par with that of shrimpculture.

MANNI, RICCARDO - Morphological functionality of radial facets of the cyrtocrinids, Jurassic cyrtocrinids of central Italy.

MANNIFIELD, KAY - Dinantian crinoids from northwest Ireland; exploring Camerate ? extinction; crinoid palaeoecology, autecology and palaeobiology; also looking at carbonate reefal environments etc.

MANSO, CYNTHIA L.C. - The echinoids from the middle Cretaceous of the Sergipe Basin (Brazil).

MAPLES, CHRISTOPHER G. - Devonian-Permian crinoid and blastoid paleobiogeography rebound from mass extinction; Late Paleozoic invertebrate paleoecology.

MARAN, ALEKSANDRA A. - Palaeoecological research of Lower Cretaceous Echinoidea from eastern Serbia (YU); irregular echinoids, especially genus *Heteraster*, *Toxaster*, (Spatangoids) and *Holaster*, biostratigraphy, palaeoecology, taphonomy; Cretaceous echinoids from Serbia (YU); Lower Cretaceous echinoids (Urgonian) and accompanying macro and micro fauna; Lower Cretaceous foraminifers (Orbitolinids).

MARCOS-DIEGO, CONCEPCION - Study of benthic fauna and flora from the southern of the Livingston Island (South Shetland, Antarctica).

MARCUS, SARA - I am exploring the phylogenies and ontogenetic series of the Paleozoic crinoid Superfamilies Allagecrinacea and Codiocrinacea, also commonly called microcrinoids. I am in the process of revising both of these Superfamilies.

MARSH, LOISETTE M. - Echinoderms of the Dampier Archipelago, Northwestern Australia.

- MARTIN, RICHARD B. - Introduction and translocation of nonindigenous marine species; development of a marine pest information database; community detection of marine pest incursions.
- MARTINEZ, PRISCILLA C. - Population and reproductive biology of the sea cucumber *Isostichopus fuscus* in the Galapagos Islands.
- MASCARENHAS, BERNARDO JOSE DE A. - Pattern of distribution of asteroidea from Guanabara Bay, Rio de Janeiro, Brazil.
- MASON, JOANNE C. - Reproductive behaviour of echinoderms.
- MASSIN, CLAUDE - Holothurian taxonomy; Indonesia, Malaysia, Madagascar.
- MATA PEREZ, EUSTOLIA - Sea stars of the Family Luidiidae (Echinodermata: Asteroidea) from the coast of Mexico.
- MATERIA-ROWLAND, CHRISTINE J. - Developing a manual on coastal and marine monitoring; biological analysis and sediment chemistry analysis of the impact of the aquaculture industry on benthic fauna.
- MATTOS-SEGOVIA, ELIO - The assessment of bioinducers of the settlement in larvae of sea urchin *Loxechinus albus*.
- MAUBON, ROGER M. - Preparing inventories (or catalogs) of historical collections of Echinoderms in institutions like Museum of Nancy (Paul Thiery), Museum of Chambéry (Savin, Demoly) and Museum of La Rochelle; addendum (1998) to inventories (1994) of echinoderms in Grenoble, Museum of Natural History.
- McBRIDE, SUSAN - I just spent one of sabbatic research at the National Center for Mariculture in Eilat Israel. We worked with *Paracentrotus lividus* and looked at gonad production with algal and prepared diets, gonad pigment biochemistry, and nutritional characteristics.
- McCLINTOCK, JAMES B. - Chemical ecology of echinoderms from the Gulf of Mexico and Antarctica.
- McEDWARD, LARRY R. - Simulation models of larval planktotrophy in marine invertebrates; effects of endosulfan on larval development of sea urchins.
- McKENZIE, J. DOUGLAS - I've left the Scottish Association for Marine Science (SAMS) and am now running Scotland's first marine biotechnology company. We deal mostly with marine invertebrates and will hopefully be continuing with some aspects of my echinoderm research, particularly cell cultures, surface coats and bacterial symbionts.
- McLELLAND, JERRY A. - Identification and ecology of the local echinoderm fauna from the Gulf of Mexico and Caribbean areas.
- McNAMARA, KENNETH J. - Neogene species of the clypeasteroid *Peronella* from Western Australia; Paleocene spatangoids from the Carnarvon Basin, Western Australia; Miocene echinoids from the Carnarvon Basin, Western Australia; Eocene echinoids from the Bremer Basin, Western Australia; fauna of Australia - spatangoids, holasteroids, clypeasteroids, cassiduloids (with Rich Mooi); general echinoid morphology, physiology and biogeography.



MEDEIROS-BERGEN, DOT E. - Selective constraints on brittlestar life histories.

MEIJER, LAURENT - Molecular mechanisms of cell cycle regulation, using starfish oocytes and sea urchin embryos as cellular models; circadian control of the cell division cycle; identification of novel anti-mitotic compounds, with potential anti-tumor activity, using mechanism-based screening assays (purified cell cycle regulating enzymes; detection of inhibitors of cell cycle regulating enzymes in extracts prepared from marine invertebrates (collaboration with Dr. G.R. Pettit, Cancer Research Institute, Arizona State University, Tempe, Arizona).

MELIKOV, OKTAY HAMZA - Investigation, evolutionary, systematic and development of orders Spatangoid, Holasteroid and Holoctypoid of Azerbaijan (late Cretaceous and Eocene).

MERCIER, ANNIE - I am currently working on the ecology of juveniles and adults of the tropical sea cucumber *Holothuria scabra*, and on the northern sea cucumber *Cucumaria frondosa* in the St. Lawrence Gulf and Estuary, eastern Canada. My main fields of research include aquatic toxicology, chemical ecology, reproductive biology, spawning, settlement and daily cycles (movement, feeding, etc.).

MESSING, CHARLES G. - Systematics and phylogeny of comatulid crinoids.

MEYER, CHRISTIAN A. - Tertiary asteroids from the Eggenburg area (Austria); Fossilium catalogus Austriae, Part Asterozoa.

MEYER, DAVID - Paleocology, taphonomy, and functional morphology of *Uintacrinus* (Cretaceous) (with Clare Milsom). Distribution and functional morphology of crinoids in the Cincinnatian Series (U. Ordovician) of the Cincinnatian Arch region. New edriasteroid assemblages from the Cincinnatian (with Colin Sumrall and Carl Brett). Status of crinoid populations on reefs in the tropical Western Atlantic (with Peter Lask). Functional morphology of the "pinnule-swivel" in comatulid crinoids from the Great Barrier Reef (with Tom Baumiller).

MILLER, ROBERT J. - Evolution and biogeography of the Elaspoda (Holothuroidea).

MIRONOV, ALEXANDER - 1) Taxonomy of the deep sea echinoderms (echinoids of the order Holasteroidea, stalked crinoids of the suborder Bourgueticrinina, asteroids of the family Porcellanasteridae and holothurians of the family Myriotrochidae). 2) Biogeographical history of the deep sea echinoderm fauna.

MITROVIC-PETROV, JOVANKA R. - Study of some Cretaceous and Neogene echinoids of Serbia and Monte Negro (taxonomy, paleoecology, functional morphology, taphonomy); study of some Cretaceous and Neogene echinoids of Greece (with A.Marcopoulou-Diacantoni - Athens).

MLADENOV, PHILIP V. - Biology, ecology and population genetics of asexual echinoderms; parthenogenesis in echinoderms; population and evolutionary genetics of *Amphipholis squamata*; sea cucumber fisheries of the Cook Islands; ecology and systematics of New Zealand brittle stars.

MONTAGUE, CHRISTOPHER - Regeneration capabilities of sea stars in closed systems.

MOONEY, ROBERT C. - Red sea urchin (*Strongylocentrotus franciscanus*) management by the Hesquiaht First Nation: implications for community structure and the successful establishment of a commercial sea urchin fishery.

MOORE, ABIGAIL M. - Trying to set up a community-based project aiming to combine consensus-based local

management of marine resources with various other initiatives to improve the economic and educational status of the villagers. This may be combined with trials of reef repair system and re-seeding of some species. Also possible involvement in one or more holothurian pen-culture projects for rearing juveniles to maturity before processing them.

MORGAN, ANDREW - I have started my PhD on the ecology and culture of the sea cucumber *Stichopus mollis* and am supervised by Dr. Russ Babcock, School of Environmental and Marine Science, Leigh Marine Laboratory, University of Auckland. We have secured industry funding for the next three years in a cooperative venture with the abalone industry. The PhD project involves production of seed, grow-out and farming, polyculture and fisheries research.

MORGAN, KATHERINE - Lecithotrophy in starfish; the evolution of developmental patterns and life cycle evolution.

MORGAN, RAPHAEL - Currently preparing a PhD Thesis: Comparative study of the recruitment modalities of two common brittle-stars of the English Channel-North Sea region (*Ophiothrix fragilis* and *Ophiura albida*).

MORRILL, JOHN B. - Experimental analysis of primary invagination in the sea urchin, *Lytechinus variegatus*; Descriptive morphology of the embryonic development of the sea urchin, *Echinometra lucunter*.

MOTOKAWA, TATSUO - Biology of stalked crinoids; catch connective tissue.

MUKAI, HIROSHI - Ecosystem study in tropical and boreal seagrass beds; bioturbation and restructural effects on material flow at interface of sea floor.

MUSA, NADIRAH - Histology of the sea cucumber.

NAIDENKO, TAMARA K. - Cryopreservation of sea urchin embryos and larvae bioassay by using sea urchin eggs and embryos.

NAKAI, SAORI - Echinoids of the family Temnopleuridae.

NATARAJAN, P. - Aquaculture, fish and shrimp culture, fish pathology; planning to implement echinoderm culture in India.

NEBELSICK, JAMES H. - Taphonomy of reef echinoids; Lower Miocene echinoid palaeobiogeography.

NEILL, BRUCE J. - Biogeography, systematics and population biology of echinometrids.

NEPOTE, ANA CLAUDIA - Holothurians of Marietas islands, Nayarit, Banderas Bay, Mexico; systematics of holothurians of Banderas Bay, Mexico (central Pacific).

NESTLER, HELMUT - Cretaceous echinoids from South Yemen; Isolated elements of maestrichtian crinoids.

NEUMANN, CHRISTIAN - Cretaceous irregular echinoids: taphonomy and predation; post-larval development of the sand dollar *Leodia sexiesperforata*; Cretaceous echinoids of Texas.

NICHOLS, DAVID - Reproductive cyclicality in the New Zealand crinoid *Oxycomanthus plectrophorum*; seasonality in resource allocation in the English Channel starfish *Luidia ciliaris*.

NICOSIA, UMBERTO - Systematics and evolutive trends of Cyrtocrinids.

NISHIHARA, MORITAKA - Effect of heart urchins on coral community structure of the sandy bottom.

NISHIZAKI, MICHAEL T. - Fluid dynamic influences on the growth and survival of juvenile sea urchins (*Strongylocentrotus franciscanus* and *S. purpuratus*) - for MSc started Sept 1998 at University of Northern British Columbia.

NOJIMA, SATOSHI - Feeding habits and effects of sea stars on benthic organisms.

O'CONNOR, BRENDAN D. - Bioturbation rates of infaunal echinoderms; connection between hydrographic features and high density ophiuroid populations.

O'HARA, TIMOTHY D. - Echinoderms of Macquarie Island (final stages); patterns of diversity for faunal assemblages on subtidal reefs off central Victoria (Ph.D. thesis, University of Melbourne).

OJEDA, F. PATRICIO - Ontogenetic changes in the diet of *Loxechinus albus*: an ecophysiological approach. Ecology of intertidal rockpools: role of sea urchins and fishes in determining community patterns.

OJI, TATSUO - Paleontology and biology of stalked crinoids; especially regeneration of crown and arms, and evolutionary history of isocrinines.

OLSZEWSKA-NEJBE, DANUTA - Studying the irregular echinoids in the North European Province; stratigraphy and paleobiogeography.

OLVER, JANE B.S. - Mesozoic irregular echinoids; extant British species.

PABIAN, ROGER K. - Late Paleozoic crinoids, paleoecology, associated fauna and parasitic, prey and predation relations; biostratigraphy.

PAGETT, RICHARD M. - Caspian Sea: literature review.

PARDO ANGEL, ROBERTO - Ecology and population dynamics of echinoderms (particularly echinoids and ophiuroids) - currently, population dynamics of sand dollars.

PARMA, SARA GRACIELA - Cretaceous and Tertiary echinoids from Patagonia and La Pampa Province, Argentina.

PARSLEY, RONALD L. - Reworking stylophoran phylogeny.

PAULS, SHEILA MARQUES - Distribution of the echinoids in coral communities.

PAYNE, ADAM - Studying the association between damselfish and brittlestars in Jamaica. I am especially interested in predatory and carrion feeding brittlestars and associations between the ophiuroids and other animals of different taxa and phyla.

PEARCE, CHRIS - Roe enhancement of the green sea urchin using prepared feeds. Juvenile grow-out strategies for the green sea urchin.

- PENCHASZADEH, PABLO E. - Working on the diet of endemic starfish *Luidia* and *Astropecten* and the reproduction of the sea urchin *Pseudechinus* and the holothurian *Psolus*.
- PENNINGTON, J. TIMOTHY - Primary production in the central California upwelling zone; brachiopod larvae of the Monterey Bay Submarine Canyon.
- PEREIRA MAJER, ALESSANDRA - Reproductive and behavioral aspects of *Synaptula hydriformis* (Holothuroidea, Apoda) reared in laboratory.
- PEREZ-RUZAFÁ, ANGEL - Wetlands and coastal lagoons of Galapagos Islands (Ecuador) - basis for its protection and management; Iberic fauna; study of benthic fauna and flora from the southern of Livingston Island (South Shetland, Antarctica); design of new algorithms for the primary productivity and water quality prediction in coastal zones using remote sensing techniques.
- PETR, VACLAV - Preparation of a photographic, comprehensive book, "Atlas of Echinoderms of the Barrandian area". This book will be written in English and published at the end of 1998.
- PETROVA, IRINA YU. - Structure and functions of echinoderms lectins.
- PHILIPPE, MICHEL - Miocene echinoids.
- PIEPENBURG, DIETER - Ecology of brittle stars in Arctic and Antarctic seas.
- PIZER, MARGARET - Evolution of echinoderm metamorphosis.
- PODOLSKY, ROBERT D. - Evolution of life history characters in ophiuroid genus *Macrophiothrix*; Evolution of gamete characters in echinoid genus *Strongylocentrotus*.
- PORTELL, ROGER W. - Echinoid biostratigraphy of Florida (especially undescribed Miocene taxa); Miocene echinoderms of Jamaica.
- PRESTEDGE, GEOFFREY K. - Study of Pittwater, S.E. Tasmania, re: the regrowth of *Zostera* sp., also *Codium* sp. beds now that nutrient levels in the water have decreased with upgrading of local sewerage treatment plants, and to see if several species of echinoderms return if the above species of algae recover sufficiently.
- PROKOP, RUDOLF JAN - Devonian echinoderms from the Barrandian area; systematics, palaeoecology, biostratigraphy (together with V. Petr).
- PUTCHAKARN, SUMAITT - Echinoderms associated with some sponges in coral reefs along the eastern coast of the Gulf of Thailand.
- RAJAKUMAR, C. P. - Biology and ecology of certain Indian echinoderms; investigating the bioactive substances of Indian echinoderms.
- RAM MOHAN, M. K. - Ph.D. project on the reproductive cycles of *Holothuria atra*.
- REGIS, MARIE-BERTHE - Population dynamics of regular echinoids in the Mediterranean; enzymatic study of the nutrition of *Paracentrotus lividus* (Echinodermata: Echinoidea).

- REICH, MIKE - Revision of the fossil holothurian parafamily Priscopedatidae Frizzell & Exline, 1956 (Ordovician-Quaternary)[in collaboration with Prof. Dr. H. Mostler, Innsbruck]; Silurian holothurians from the Isle of Gotland (Sweden); Campanian and Maastrichtian holothurians from Europe; fossil isolated calcareous ring elements of Holothuroidea (Palaeozoic and Mesozoic); Silurian ophiocistioids from the Isle of Gotland (Sweden) [in collaboration with M. Kutscher, Sassnitz].
- REMPALA, ERIN - Jaw ossicle evolution in the asteroids; phylogenetic analysis of *Linckia*.
- REY, DANIEL - Cretaceous and Tertiary echinoids of Spain.
- RINELLI, PAOLA - National and international trawl-surveys projects (GRUND; MEDITS) for the evaluation of demersal resources (in which the macrobenthic fauna is studied with trawl net as well as grab and dredge).
- ROBINSON, SHAWN - Our team is looking at the culture of sea urchins from a gonad enhancement perspective as well as full-cycle culture of urchins from egg to adult. This involves hatchery technology, containment systems, diet development and commercial development.
- ROCCATAGLIATA, ALEJANDRO J. - Chemistry of physiologically active compounds isolated from starfishes and brittle stars in the South Atlantic Ocean.
- RODRIGUEZ, SEBASTIAN R. - Subtidal brown macroalgae forests as food sources for intertidal organisms: role in determining community patterns in the rocky intertidal environment.
- ROGERS-BENNETT, LAURA - Examining the impact of larval feeding history on the growth and success of newly settled red sea urchins; examining the survival of newly settled urchins exposed to micro-predators in the benthos; spatial patterns in the growth and survival of juvenile red abalone.
- ROSE, EDWARD P.F. - Jurassic irregular echinoids; Cenozoic holoctypoid echinoid *Echinoneus*.
- ROTMAN CLARK, HELEN E.S. - Systematics of Southern Ocean asteroids.
- ROUX, MICHEL - Taxonomy, ontogeny, ecology of recent and fossil Articulata (Crinoidea).
- ROWE, FRANK W.E. - Indo-west Pacific echinoderms and their systematics and zoogeography; Indian Ocean echinoderms with A.C. Campbell.
- ROY, MICHAEL S. - Evolutionary history of *Amphipholis squamata*; Phylogeography and human influence in *Ophiactis savignyi* distributions; The effects of fiords on population structure of marine invertebrates; Developmental evolution of asteroids.
- SABA, MASAKI - Taxonomic studies of Japanese sea-stars.
- SADLER, KIRSTEN - 1) Signaling pathway leading to cell cycle activation and meiotic maturation in starfish oocytes. 2) Cryopreservation of starfish oocytes, eggs and embryos. 3) Distribution mapping and determination of breeding cycle of starfish in The Bosphorus and Sea of Marmara.
- SALAMON, MARIUSZ ANDRZEJ - Triassic crinoids.
- SAMYN, YVES - Distribution and biodiversity of holothuroids along the Kenyan coast; feeding biology of

commercial holothuroids from Kenya; reproductive biology of commercial holothuroids from Kenya; distribution and biodiversity of regular echinoids along the Kenyan coast.

SANFORD, ERIC - Influence of water temperature on the physiology and community role of the sea star, *Pisaster ochraceus*.

SANO, MINORU - Population ecology of *Strongylocentrotus nudus*.

SASTRY, DWADASI R.K. - Echinoderm fauna of Andaman and Nicobar Islands and their coral reefs.

SAUCEDE, THOMAS - Apical system and primitive irregulars; systematic and plates structure in the family Pourtalesiidae.

SCALLY, KEVIN B. - Tooth form function and evolution of invertebrate dental systems (in particular, echinoids), especially tooth sharpening behaviour (thegosis).

SCHEIN, JASON P. - The relationship between living echinoid populations and their skeletal remains in the sea-floor sediment, San Salvador, Bahamas.

SCHELTEMA, RUDOLF S. - Capacity of larvae to delay settlement, competence of larvae encountered in the open ocean to retain their capacity to metamorphose.

SCHOPPE, SABINE - Sea cucumber fishery in Philippines. Morphology and taxonomy of *Ophiactis* spp.

SCHUETZ, ALLEN W. - Development of a new model for multiparameter analyses of perturbations of gametic and embryonic processes.

SCHUHMACHER, HELMUT - Bioerosion on Red Sea coral reefs within the context of carbonate budget.

SCHULTZ, HEINKE - Identifying Antarctic echinoids housed in the Alfred-Wegener-Institute for Polar and Marine Research in Bremerhaven as volunteer: cidarids, but mainly brooding schizasterids; interested also in other irregulars.

SEETO, JOHNSON - Taxonomy of Fiji echinoderms.

SERAFY, D. KEITH - Biogeography of Atlantic Ocean echinoids; Age and growth studies of *Echinarachnius parma*.

SEVASTOPULO, GEORGE D. - Functional morphology of *Pygmaeocrinus* (with Rudolf Prokop); Carboniferous microcrinoids from northwest Ireland; A new Carboniferous microcrinoid genus from Belgium; Late Tournaisian crinoid faunas associated with Waulsortian carbonate mounds.

SEWELL, MARY A. - Life-history and early development in echinoderms; temperature effects on larval development; holothurian reproduction and ecology; larval physiology.

SHEPHERD, SCORESBY A. - Sea urchin culture.

SHICK, J. MALCOLM - Effects of UV on echinoid eggs and embryos; dietary accumulation of mycosporine-like amino acids by echinoids.

- SHIRLEY, THOMAS C. - Predator-prey and competitive interactions between sea otters, crabs and starfish in Glacier Bay, Alaska.
- SIBUET, MYRIAM - Deep sea ecology and deep sea echinoderms; cold deep environments; deep sea basins.
- SKOLD, MATTIAS - The role of environmental factors in regulating sexual and asexual reproduction in sea stars. Genetics of sexual and asexual populations of the sea star *Coscinasterias muricata* around New Zealand. Population dynamics, growth, regeneration, feeding and predator-prey interactions in brittle stars. Structuring mechanisms in marine benthic populations; interactions between burrowing heart urchins (*Brissopsis lyrifera*) and brittle stars (*Amphiura chiajei*). Ecotoxicology and fate of contaminants in marine environments, especially infaunal brittle stars.
- SLOAN, NORMAN A. - Sea cucumber harvest on west coast of North America.
- SMILEY, SCOTT - Annotated catalogue of holothurians with synonymies; annual cycle of *Parastichopus californicus*, changing conditions of body wall muscles.
- SMIRNOV, ALEXEI V. - Arctic echinoderms fauna; holothurians of the North Pacific; taxonomy of apodid and molpadid holothurians.
- SMIRNOV, IGOR S. - Taxonomic studies of arctic and antarctic ophiuroids, creation of illustrated computer key for arctic brittle-stars and data bases on ophiuroids of Arctic and Southern Oceans.
- SMITH, ANDREW B. - Morphological and molecular phylogenies of echinoderms; Maastrichtian and Palaeocene echinoids.
- SMITH, L. COURTNEY - Evolution of the deuterostome immune system; Immunity and cellular defense mechanisms in invertebrates; Sea urchin immunology.
- SMITH, MICHAEL J. - Mitochondrial gene order and early deuterostome evolution; Molecular phylogenetics of larval life history strategies.
- SOLANDT, JEAN-LUC - exploring possibilities of funding toward using *Diadema* as a grazing 'tool' in deeper reef communities in order to restore >10m deep Jamaican (and possibly wider Caribbean) reefs to pre-hurricane coral dominated seascape. Research would involve movement of animals top deeper waters, coralling them and subsequently monitoring effects of their grazing at intermediate (8 per m square) densities.
- SOLIS-MARIN, FRANCISCO A. - Ecology and molecular taxonomy of echinoderms in the North Atlantic (for PHD program at Southampton Oceanography Centre, in progress).
- SOLOVJEV, ANDREY N. - Holasteroid and spatangoid echinoids (evolution, classification, paleoecology); echinoids on the Cretaceous/Paleogene boundary.
- SONNENHOLZNER, JORGE I. - Systematic evaluation of the reef echinoderms at the Machalilla National Park, Manabi, Ecuador; ecology of the sand dollar *Mellita longifissa* Michelin intertidally at the Machalilla National Park, Manabi, Ecuador.
- SPENCER, LARRY T. - Symbiotic relationship between *Holothuria atra* and the polka-dot crab in the Hawaiian sublittoral zone.

- SPIRINA, IRINA S. - Morphology and regeneration of respiratory trees in holothurians.
- SPIRLET, CHRISTINE - Starting new project at Universite de Mons-Hainaut (Belgium) in September: study of the impact of sand and gravel extraction on the coastal ecosystem, with emphasis on benthic organisms.
- SPONER, RENATE - Molecular evolution of ophiuroids: phylogeny, phylogeography, population genetics in *Amphipholis squamata*, *Ophiactis savignyi*, *Ophiocoma scolopendrina*. (<http://www.dnapop.zi.ku.dk>)
- STANCYK, STEPHEN E. - population biology, predation and regeneration of *Ophiura sarsi*; sublethal predation of echinoderms; use of markers and growth rings of ophiuroid ossicles for age/growth studies.
- STARMER, JOHN A. - Annotated checklist of ophiuroid fauna of Guam; additional ophiuroid records from Mauritius; annotated checklist of ophiuroids from Palau; population dynamics of *Tripneustes gratilla* in the micronesian country of Palau.
- STEWART, BRIAN G. - Reproductive biology of *Astrobrachion constrictum* and *Ophiopsammus maculata* (Echinodermata: Ophiuroidea); growth rate and reproduction in *Stichopus mollis* (Echinodermata: Holothuroidea).
- STICKLE JR., WILLIAM B. - Effects of seasonal and latitudinal temperature variation on aerobic-anaerobic transitions in the *Leptasterias* spp. complex and the biological impact of the ciliated protozoan parasite, *Orchitophrya stellarum* on asteriid sea stars from the west coast of North America.
- STOEHR, SABINE - Diversity in tropical Ophiuroidea.
- STORC, RICHARD - Ophiuroids and asteroids from the Upper Cretaceous (Cenomanian- Turonian) of the Bohemian Cretaceous Basin (Czech Republic).
- STRATHMANN, RICHARD R. - Developmental plasticity of larvae; limits on the aggregation of embryos; evolution of rates of development of embryos; biota of habitat patches isolated by distance.
- STUMP, RICHARD J. - Population dynamics of *Acanthaster planci* (L.)
- SU, X. - Microstructure and mechanical properties of mollusc shells; Regeneration of mollusc shells; In vitro mineralization of CaCO<sub>3</sub> in the presence of proteins extracted from mollusc shells.
- SUMIDA, PAULO Y.G. - Ecology and ontogeny of the post-larval development in deep-sea ophiuroids.
- SUMRALL, COLIN D. - Phylogeny of primitive Echinodermata; Edrioasteroid systematics; primitive echinoderm paleoecology.
- TABLADO, ALEJANDRO - Taxonomy of Asteroidea from southwestern Atlantic; Intertidal ecology of rocky shores of Argentina.
- TAKAHASHI, KEIICHI - Physiology of the madreporite; physiology of echinoid spine muscle and catch apparatus; motile mechanism of echinoderm sperm flagella.
- TALBOT, TIFFANY D. - Salinity tolerances and other factors of *Ophiophragmus filigraneus*.



- TAVARES, YARA A. G. - Ecology, histology, morphology studies of *Mellita quinquesperforata* in beaches of Parana's State, relation between morphodynamics and spatial distribution.
- TELFORD, MALCOLM - Collagen in tooth support mechanism of clypeasteroids; podial forces in *Asterias*; computer simulation of *Dendraster* distribution.
- THANDAR, AHMED S. - Monograph of the southern African holothuroid fauna. Study of the deep sea holothuroids collected off the southern African east and west coasts.
- THAPANAND, THANITHA - Population dynamics of fish and invertebrates of Thailand.
- THIERRY, JACQUES - Jurassic (Mesozoic) echinoids - France and some western Europe countries; morphology and relation with palaeoenvironment changes (overall sea-level variation).
- THOMAS, FLORENCE I.M. - Physical properties of echinoderm gametes. Effect of hydrodynamics on gametes and developmental stages.
- THORNDYKE, MICHAEL C. - Regeneration, neuronal development and regeneration, growth factors, gene-regulation of regeneration and response to environmental conditions.
- THORSEN, MARIANNE S. - The ecophysiology of the irregular sea urchin *Echinocardium cordatum* - interactions with gut microbiota.
- TIAGO, CLAUDIO - Biology of marine invertebrates, especially echinoderms.
- TIEFENTHALER, LIESL - Research on the red brittlestar *Amphiodia urtica*.
- TOMINAGA, HIDEYUKI - Biology of the brittle star, especially sexual dimorphism brittle stars, *Ophiodaphne formata*, *Ophiosphaera insignis* and *Amphilycus scripta*, encompassing development and ecology.
- TOMMASI, LUIZ ROBERTO - Palaeobiogeography and modern biogeography of echinoderms in the South Atlantic and Antarctic regions (especially in Brazilian REVIZEE material - NE and SE Brazilian areas).
- TRONCOSO, JUAN F. - Identifying collections of Antarctic echinoderms in the Natural History Museum of Concepcion, Chile; studying several species of echinoderms from the Pacific coast Eight Region; the conservation problems of the echinoderms of Chile and their future projection.
- TURNER, RICHARD L. - Various projects on systematics and biogeography of echinoderms from the western Atlantic, all classes.
- TURON, XAVIER - Evaluation of sublethal impact of pollution on benthic invertebrates; reproductive strategies of ascidians and echinoderms; chemical defense mechanisms in sponges.
- TUTERA, PETER - Monograph of the irregular echinoids of Prydz Bay, Antarctica; new *Pachycentrotus* species.
- UBAGHS, GEORGES J. - New echinoderms from the Upper Cambrian of the Montagne Noire (southern France).

UTHICKE, SVEN - Population genetics and stock size of commercially fished holothurians; asexual reproduction in holothurians.

v.JUTERZENKA, KAREN - Ecology of Arctic ophiuroids and their function within the benthic food web (within the framework of AOSGE).

VADAS, ROBERT L. - Ecology and reproductive biology of sea urchins along the coast of Maine. Funded by NOAA Sea Grant (1995-1997); temporal and spatial variability in reproduction and roe yield in green sea urchins. Tentatively funded by Maine Dept. Mar. Res. (1996-1997).

VADET, ALAIN - Evolution of Jurassic echinoids.

VALENTINE, JOE - Studying the interaction between a local sea urchin species and a recently introduced macroalga in subtidal waters (for PhD at the University of Tasmania).

VALENTINE, JOHN - Continuing investigations of sea urchin herbivory and predation on sea urchins in the Florida Keys.

VAN DER HAM, RAYMOND W.J.M. - *Hemiaster* and *Echinogalerus* of the Upper Cretaceous of NW Europe.

VAN HOUT, TESSA - Distribution of *Echinothrix diadema* in Kenyan reefs.

VANDENSPIEGEL, DIDIER - The defensive mechanism of the Echinodermata: structure and functions of the Cuvierian tubules.

VAROTTO, RICARDO - Growth of the irregular echinoid *Cassidulus mitis* (Cassiduloidea).

VEGA, JUAN TORRES - Study of the echinoids and ophiuroids collected on the Campanas Oceanograficas Proibe I-II-III-IV-V.

VELARDE, RONALD G. - Benthic infauna and trawl invertebrates of the Southern California Bight, taxonomy and distributional ecology (in conjunction with other monitoring agencies in southern California).

VERLING, EMMA - Niche plasticity in echinoderms in Ireland - in particular, the asteroid *Marthasterias glacialis* and the echinoid, *Paracentrotus lividus*.

VIADA, STEPHEN T. - Characterization study of the 'pinnacles' topographic features in the north central Gulf of Mexico.

VIKTOROVSKAYA, GALINA I. - Reproduction of invertebrates in artificial and natural conditions

VILLIER, LOIC - Radiation of the genus *Heteraster* (Lower Cretaceous Spatangoida); taxonomy, phylogeny and disparity (for Ph.D. dissertation). Also, taxonomic and phylogenetic revision of the family Stauranderasteridae (fossil Asteroidea).

VISTISEN, BODIL K. - Studying the two brittle stars *Ophiura albida* and *Amphiura filiformis* concerning their tolerance towards hypoxia with and without the presence of hydrogen sulphide.

**WALKER, CHARLES W.** - We are concerned with the normal and altered structure and function of tissues and genes in marine model organisms. Currently, we focus on manipulating gametogenesis of the green sea urchin for applications in land based aquaculture and on understanding leukemogenesis and the effects of antineoplastic drug therapies on leukemia in the softshell clam model for acute lymphocytic leukemia in humans.

**The Sea Urchin Model** - On the eastern coast of the United States, adult, green sea urchins (*Strongylocentrotus droebachiensis*) are the subject of a fishery for their ripe gonads. Unregulated harvesting has resulted in loss of productive beds and a projected collapse of the fishery. A suite of technologies exists for developing modular, land-based aquaculture ventures that depends on manipulating sea urchin genes relevant to the somatic and gametogenic cells within the gonads. In particular, the cDNA sequences for a major yolk protein (MYP) and for the transcription factor c-myc are important. Together with the urchin industry, we are using molecular procedures to produce urchins that are characterized by superior size, taste, color, texture and firmness.

**WALLACE, BRENDA** - Sea urchin larval culture - *Lytechinus variegatus*.

**WAREN, ANDERS H.** - Gastropods parasitic on echinoderms.

**WASSON, KRISTINA** - Reproduction and factors that control reproduction in echinoids.

**WATTS, STEPHEN A.** - Steroid biology in echinoderms; aquaculture of echinoids.

**WEBSTER, GARY** - 1) Continuing compilation of the bibliography and index of Paleozoic crinoids. 2) Devonian and Carboniferous crinoids of Iran (with Chris Maples). 3) Carboniferous crinoids of Algeria (with Chris Maples, Terry Frest, George Sevastopulo, and Johnny Waters). 4) Carboniferous crinoids of the western U. S. and SE Alaska.

**WELSCH, ULRICH** - Innervation of the juxtaligamental cells in crinoids; analysis of the connective tissue of crinoids.

**WHITE, CHRIS** - Crinoids.

**WIDDISON, ROSANNE** - Ph.D. dissertation (started 10/97) entitled, Palaeobiology of Silurian crinoids. Involves a complete taxonomic review of UK Silurian collections and establishment of crinoid communities in UK. Also looks at the variations in US and UK faunas.

**WIGHAM, BEN** - Reproductive biology, ecology and population genetics of Elapsipodid holothurians from the NE Atlantic; influence of seasonal phytodetrital fluxes on changes in the structure of abyssal megafauna communities (for Ph.D. dissertation).

**WILKIE, IAIN C.** - Functional morphology and mechanics of the echinoid lantern; functional morphology and mechanics of the ophiuroid mouth-frame; organisation, mechanics and physiology of echinoderm connective tissues; autotomy mechanisms of echinoderms and other invertebrates.

**WILLCOX, MARK S.** - Molecular phylogeny of asteroids; genetic basis to salinity adaptation in asteroids.

**WILLIAMSON, JANE E.** - An autogenic shift in the response of the echinoid, *Holopneustes purpurascens*, to host plant chemistry (current Ph.D. at the University of New South Wales). Intense grazing by the sea urchin

*Heliocidaris erythrogramma* on algal community structure (group project).

WIRTZ, PETER - Marine fauna - zoogeography of the Azores, Madeira, Canary Islands, Cape Verde Islands.

WORHEIDE, GERT - actuopaleontology and ecology of *Astrosclera willeyana* Lister 1900 (Demospongiae) (for Ph.D. thesis); taphonomy of coral reef echinoids.

WRAY, GREGORY - We are working on a range of projects, most of which have to do with the evolution of development and life history in echinoderms. They include: (1) an analysis of the changing roles of key developmental regulatory genes in echinoderms, including differences in expression domains and function between echinoderms and other phyla and also the diversification of these features within echinoderms; (2) a phylogenetic analysis of the Asterozoa based on mitochondrial and nuclear sequence data; (3) a detailed analysis of the evolution of gene regulatory sequences (promoters and enhancers) for several echinoderm genes; and (4) a study of cell lineage and cell-cell interactions during the development of the adult rudiment in sea urchins.

YAMAGUCHI, MASASHI - Supervising a thesis on *Acanthaster planci*.

YANAGISAWA, TOMIO - Larval development from plutei to metamorphosis of the sea urchins in the Ogasawara (Bonin) Islands.

YEVDOKIMOV, ALEXANDR - I am interested in studying effects of visible light on ontogenesis. I am presently studying effects of visible light (520 nm and 720 nm) on reproduction and ontogenesis of *Strongylocentrotus intermedius* and *Strongylocentrotus nudus*. I will be very thankful if I can get contacts with specialists in Echinodermata and ecologists. [dunupi@hotmail.com](mailto:dunupi@hotmail.com)

YOKOTA, YUKIO - Extracellular matrix and morphogenesis in the sea urchin; phylogenetic analysis of yolk proteins in sea urchins and starfishes; functions of vitellogenin and vitellogenin in the sea urchin and starfish.

YOSHIZATO, KATSUTOSHI - Molecular evolution of invertebrate collagen.

YUND, PHIL - Fertilization processes, gamete toxicology, and the genetic differentiation of populations of *Strongylocentrotus drobachensis*.

ZAVODNIK, DUSAN V. - Echinoderms in the menaced and protected areas of the Adriatic Sea; Echinoderm distributional patterns.

ZITT, JIRI - Lower Cretaceous crinoids of West Carpathians; crinoids and echinoids of the Bohemian Cretaceous Basin (late Cenomanian- early Turonian).

☆☆☆ ECHINODERM SPECIALISTS 'KEYWORD' LIST ☆☆☆

ABREU, MARIA HELENA	ECHINOIDEA
ABREU, MERCEDES	SYSTEMATICS ECOLOGY
ADAMS, NIKKI	UV SEA-URCHIN EGG EMBRYO DEVELOPMENT
ADDISON, JASON	GENE-FLOW DISPERSAL EVOLUTION MICROSATELLITE-DNA
AGATSUMA, YUKIO	ECHINOIDEA ECOLOGY POPULATION-DYNAMICS
AHEARN, CYNTHIA	TAXONOMY HOLOTHUROIDEA ASTEROIDEA ECHINOIDEA OPHIUROIDEA
AHLGREN, MOLLY	HOLOTHUROIDEA DEPOSIT-FEEDING
ALBI, YVONNE	ECHINOIDEA PALEOCENE
ALCOCK, NICOLA	REPRODUCTION TAXONOMY DISTRIBUTION-and-ABUNDANCE
ALI, MOHAMED SAID	ECHINOIDEA TERTIARY MESOZOIC
ALLEN, JOHN	BIODIVERSITY FUNCTIONAL-MORPHOLOGY
ALLISON, WILLIAM	TAXONOMY ECOLOGY BIOGEOGRAPHY FORAGING ASTEROIDEA
AMEZIANE, NADIA	CRINOIDEA
ANDACHT, TRACY	ECHINOIDEA DEVELOPMENT DISPERSAL
ANDERSEN, AASMUND	ECHINOIDEA
ANDERSON, OWEN	ECHINOIDEA MARINE-ECOLOGY POPULATION-BIOLOGY TAXONOMY
ANDERSON, ROLAND	TAXONOMY AQUARIUM-HUSBANDRY NATURAL-HISTORY
ARAKAKI, YUJI	ECHINOIDEA ECHINOMETRA TAXONOMY PHYLOGENY
ARCHER, JEFFREY	ECHINODERMS AQUACULTURE SEA-CUCUMBER HOLOTHURIA BECHE-DE-MER AQUARIUMS
ARISOLA, AMELIA	CULTURE MEDICINAL-VALUE BIOLOGY
ARONSON, RICHARD	PREDATION-ON-ECHINODERMS Tropics to Antarctica
ASHA, PAYIKAT S.	SEA-CUCUMBER TAXONOMY NUTRITION ECOLOGY BIOLOGY
AUSICH, WILLIAM	CRINOIDEA TAPHONOMY PHYLOGENY TAXONOMY
BALSER, ELIZABETH	EVOLUTION DEVELOPMENT MORPHOLOGY PHYSIOLOGY
BANGI, HELEN GRACE	CULTURE MANAGEMENT REPRODUCTION
BARBOSA LEDESMA, ISRAEL	ECHINOIDEA CIDARIDAE TAXONOMY
BARKER, MICHAEL	REPRODUCTION FEEDING OPHIUROIDEA
BARTSCH, ILSE	OPHIUROIDEA
BASCH, LARRY	ECHINOIDEA ASTEROIDEA LARVAE JUVENILES BENTHIC-POPULATION COMMUNITY-ECOLOGY
BAUER, JOHN	ECHINOIDEA DISEASE BACTERIA FLAGELLATES
BAUMILLER, TOMASZ	CRINOIDEA ISOCRINIDS FOSSIL RECENT
BAZHIN, ALEXANDER	ECHINOIDEA POPULATION
BEAVER, HAROLD	BLASTOIDS MORPHOLOGY SYSTEMATICS
BECKER, JOHANN	SYSTEMATICS ECOLOGY ZOOGEOGRAPHY
BEGBIE, KIRSTEN	OPHIUROIDEA
BELL, BRUCE	TAXONOMY FUNCTIONAL-MORPHOLOGY
BELL, MIKE	OPHIUROIDEA ASTEROID PALEOBIOLOGY LOWER-CRETACEOUS
BENAVIDES, MILENA	TAXONOMY SYSTEMATICS
BENTLEY, ANDREW	ECHINOIDEA GENETICS BIOLOGY PALAEOBIOLOGY
BERENTS, PENELOPE	ECHINODERM-COLLECTIONS AUSTRALIA INDO-WEST-PACIFIC
BERGEN, MARY	HOLOTHUROIDEA TAXONOMY
BERTRAM, DOUGLAS	ECHINOIDEA LARVAE EVOLUTION ECOLOGY DEVELOPMENT
BIERMANN, CHRISTIANE	SPECIATION POPULATION-GENETICS MOLECULAR-EVOLUTION
	GAMETIC-REPRODUCTIVE-ISOLATION-(in camarodont urchins)
	TAXONOMY HOLOTHUROIDEA
BILLETT, DAVID	ECHINODERM-AQUACULTURE ANATOMY PHYSIOLOGY
BIRENHEIDE, RUDIGER	CORAL-REEF-ECOSYSTEM-MANAGEMENT
BIRKELAND, CHARLES	CHEMORECEPTION SENSORY-SYSTEMS MIGRATIONS
BIRYUKOVA, INGA	ECHINOIDEA FUNCTIONAL-MORPHOLOGY ECOLOGY
BLACK, W. ROBERT	ASTEROIDEA PHYLOGENY PALEOECOLOGY
BLAKE, DANIEL	ECHINODERMATA ECOLOGY BIODIVERSITY ZOOGEOGRAPHY
BLUHM, HARTMUT	ONTOGENY TAXONOMY FUNCTIONAL-MORPHOLOGY
BOCKELIE, JOHAN	HOLOTHUROIDEA ASTEROIDEA OPHIUROIDEA CYCLOCYSTOIDEA OPHIOCISTIOIDEA
BOCZAROWSKI, ANDRZEJ	ECHINOIDEA TAXONOMY STRATIGRAPHY ANATOMY ECOLOGY FOSSIL RECENT
	PHYSIOLOGY BEHAVIOR ECHINOIDEA
BOETTGER, ANNE	CRINOIDEA REGENERATION ECHINOIDEA MUTABLE-COLLAGENOUS-TISSUE
BONASORO, FRANCESCO	OPHIUROIDEA SYSTEMATICS ECOLOGY
BORGES, MICHELA	TAXONOMY ECHINODERMS CARIBBEAN
BORRERO, GIOMAR	

BORZONE, CARLOS POPULATION-DYNAMICS ECOLOGY CULTURE  
 BOSCH, ISIDRO LARVAL-ECOLOGY REPRODUCTION LIFE-HISTORY-EVOLUTION  
 BOUDOURESQUE, CHARLES PARACENTROTUS-LIVIDUS FEEDING-BEHAVIOR NUTRITION ECOLOGY ECHINOIDEA  
 BRAY, RICHARD OPHIUROIDEA ECOLOGY MICROSTRUCTURE  
 BREGMAN, YURIY SIZE-AGE-STRUCTURE GROWTH MORTALITY RECRUITMENT  
 BRETON, GERARD ASTEROIDEA PHYLOGENY TAXONOMY MESOZOIC PALAEOBIOGEOGRAPHY TAPHONOMY  
 BREWIN, PAUL ECHINOIDEA  
 BREY, THOMAS GROWTH MORTALITY PRODUCTIVITY TROPHIC-LINKS  
 BROGGER, MARTIN BIODIVERSITY TROPHIC-ECOLOGY ASTEROIDEA  
 BROWER, JAMES PALEOBIOLOGY PALEOZOIC CRINOIDEA BLASTOZOA  
 BUITRON-SANCHEZ, BLANCA FOSSIL CENOZOIC ASTEROIDEA ECHINOIDEA  
 BUNDRICK, CARLA TAXONOMY SYSTEMATICS REPRODUCTION OPHIUROIDEA  
 BURCH, BEATRICE BIODIVERSITY  
 BURNS, CASEY ECHINOIDEA EOCENE  
 BUSSARAWIT, SOMCHAI TAXONOMY ECHINODERMS ANDAMAN-SEA  
 BUSTER, PETER STRATIGRAPHY DISTRIBUTION  
 BYRNE, MARIA DEVELOPMENT REPRODUCTION EVOLUTION FUNCTIONAL-MORPHOLOGY  
 CALTAGIRONE, ANGELA ECOLOGY AQUACULTURE MEDITERRANEAN  
 CAMERON, R. ANDREW EMBRYONIC-DEVELOPMENT LARVAL-DEVELOPMENT POPULATION-GENETICS  
 CAMPAGNA, SOPHIE HOLOTHUROIDEA SEA-CUCUMBER PARASTICHOPUS POPULATION-DYNAMICS  
 STOCK-ASSESSMENT  
 CAMPBELL, ALAN ECOLOGY POPULATION FISHERY ECHINOIDEA HOLOTHUROIDEA  
 CAMPBELL, ANDREW ECHINOIDEA ASTEROIDEA PEDICELLARIAE BEHAVIOUR ECOLOGY CORAL-REEFS  
 CAMPBELL, DAVID ASTEROIDEA PREDATION SYSTEMATICS BEHAVIOR ECOLOGY  
 CAMPOS-CREASEY, LUCIA TAXONOMY SYSTEMATICS HOLOTHUROIDEA  
 CANDIA-CARNEVALI, M.D. ECHINOIDEA OPHIUROIDEA CRINOIDEA REPRODUCTION  
 CANNON, LESTER ECHINODERM-HOSTS-PARASITES  
 CARDER, NANCY TAXONOMY  
 CAREY JR, ANDREW MARINE-BENTHIC-ECOLOGY  
 CASTRO, JOAO ECOLOGY HUMAN-PREDATION POLLUTION  
 CHAO, SHYH-MIN ASEXUAL-REPRODUCTION POPULATION-ECOLOGY LIFE-HISTORY SYSTEMATICS  
 CHAVARRO, SONIA B. OPHIUROIDEA ECOLOGY HABITAT-PREFERENCE  
 CHENUIL, ANNE SPECIATION EVOLUTION BIODIVERSITY POPULATION-GENETICS MOLECULAR-MARKERS DNA  
 DALP VNTR  
 CHIA, FU-SHIANG REPRODUCTION LARVAL-DEVELOPMENT EVOLUTION  
 CINTRA BUENROSTRO, C. BIOGEOGRAPHY TAXONOMY ECOLOGY EVOLUTION  
 CLARK, ROGER TAXONOMY BIODIVERSITY ASTEROIDEA ALASKA NORTH-PACIFIC PTERASTERIDAE  
 SOLASTERIDAE HIPPIASTERIA  
 CLEMENTS, LEE ANN OPHIUROIDEA ECHINOIDEA GENE-EXPRESSION REGENERATION LARVAL-TOXICOLOGY  
 CLOUSE, RONALD HOLOTHUROIDEA BEHAVIOR TAXONOMY ECOLOGY MICRONESIAN  
 CLOUTE, M. EUGENIA OPHIUROIDEA TAXONOMY BIOGEOGRAPHY ANTARCTIC  
 COLON-JONES, ELIZABETH REARING POPULATION ECOLOGY  
 CONAND, CHANTAL TROPICAL-REEFS HOLOTHURIANS URCHINS EXPLOITATION ECOLOGY  
 CREASER, EDWIN MANAGEMENT MONITORING-C/E REGULATION SUSTAINED-YIELD  
 CRUMP, ROBIN ASTEROIDEA EMBRYOLOGY ECOLOGY BEHAVIOUR  
 CUNHA DE JESUS, D.M. BIOZOOGEOGRAPHY TAXONOMY SYSTEMATICS ECOLOGY  
 DAFNI, JACOB ECHINOIDEA ECOLOGY TERATOLOGY POLLUTION-EFFECTS  
 DALBY, JR., JAMES OPHIUROIDEA GROWTH SKELETON OSSICLE ARCTIC POLAR NUTRITION  
 DAVID, BRUNO ECHINOIDEA PALEONTOLOGY PHYLOGENY  
 DAVID, JEROME STALKED-CRINOIDS ONTOGENY BATHYMETRY  
 DAVOULT, DOMINIQUE OPHIUROIDEA PRODUCTION REPRODUCTION SUSPENSION-FEEDING  
 C-AND-N-FLUXES  
 DAYTON, PAUL ECOLOGY ECHINOIDEA OPHIUROIDEA ASTEROIDEA  
 DE RIDDER, CHANTAL ECHINOIDEA SYMBIOSES FEEDING-MECHANISMS TAXONOMY ZOOGEOGRAPHY  
 DE WIT, WALTER ECHINOIDEA FLINT-PLEISTOCENE-DEPOSITS  
 DEAN, JULIETTE ECHINOIDEA PALEONTOLOGY PHYLOGENY  
 DEARBORN, JOHN CRINOIDEA OPHIUROIDEA FUNCTIONAL-ANATOMY ECOLOGY TAXONOMY  
 DEL VALLE, ROSA HOLOTHUROIDEA  
 DETWILER, PAUL ECHINOIDEA POPULATION-DYNAMICS PHENOTYPIC-PLASTICITY LIFE-HISTORY  
 ECHINOID-CORAL-INTERACTIONS  
 DEUTZMANN, HELMUT ASTEROIDEA RESENT SYSTEMATICS  
 DEVIN, MICHAEL DEVELOPMENT-ECHINODERM-AQUACULTURE-TECHNIQUES  
 DEWAELE, YANNICK OPHIUROIDEA BIOLUMINESCENCE PHYSIOLOGY NERVOUS-CONTROL  
 DIEHL, WALTER NATURAL-SELECTION

DOBSON, WILLIAM OPHIUROIDEA ECOLOGY  
 DOLMATOV, IGOR REGENERATION-MECHANISMS MORPHOLOGY DEVELOPMENT ECOLOGY  
 DOMINGUEZ ALONSO, P. PALAEOBIOLOGY MORPHOLOGY CARPOIDEA  
 DONOVAN, STEPHEN PALAEOBIOLOGY MORPHOLOGY CARIBBEAN ECHINOIDEA CRINOIDEA  
 DORNBOS, STEPHEN HELICOPLACOIDEA PALEOECOLOGY CAMBRIAN  
 DRUMM, DARRIN HOLOTHUROIDEA FISHERIES  
 DRUMMOND, ANNE ECHINOIDEA ECOLOGY REPRODUCTION LIFE-HISTORY  
 DUPONT, SAMUEL AMPHIPHOLIS-SQUAMATA BIOLUMINESCENCE MICROEVOLUTION  
 INTRASPECIFIC-VARIABILITY  
 DY, DANILO ECOPHYSIOLOGY NUTRIENT-EXCRETION OXYGEN-CONSUMPTION ENERGETICS  
 EAGLE, MIKE CRINOIDEA ASTEROIDEA ECHINOIDEA OPHIUROIDEA  
 EBERT, THOMAS LIFE-HISTORIES DEMOGRAPHY  
 EBLE, GUNTHER BIODIVERSITY DEVELOPMENT EVOLUTION  
 EEKELERS, DIRK TAXONOMY BIODIVERSITY ASTEROIDEA  
 ELISEIKINA, MARINA REGENERATION-MECHANISMS MORPHOLOGY IMMUNOLOGY  
 ELLERS, OLAF ECHINOIDEA BIOMECHANICS EVOLUTION ECOLOGY  
 EMLET, RICHARD LARVAE SEA-URCHINS PLANKTONIC-FORMS DEVELOPMENT  
 EMSON, ROLAND ECOLOGY  
 ENTRAMBASAGUAS, LAURA BIOGEOGRAPHY LARVAE-and-EVOLUTION SPATIAL-and-TEMPORAL-DISTRIBUTION  
 SEA-URCHINS  
 CRINOIDEA  
 ETNIER, SHELLEY TAXONOMY FUNCTIONAL-MORPHOLOGY PALEOECOLOGY CRINOIDEA  
 ETTENSOHN, FRANK ECHINOIDEA ONTOGENESIS COMMUNITIES  
 EVDOKIMOV, VLADIMIR PHYSIOLOGY BIOCHEMISTRY MOLECULAR  
 FARMANFARMAIAN, A.VERDI DISTRIBUTION FEEDING-BIOLOGY PREDATOR-PREY-INTERACTIONS  
 FEDER, HOWARD LARVAE ASTEROIDEA ECHINOCULTURE  
 FELDMAN, ABBY GROWTH TAXONOMY BIOGEOGRAPHY ANTARCTICA  
 FELL, F. JULIAN SPECIATION EVOLUTION DEVELOPMENT BIODIVERSITY GENETICS MOLECULAR-PHYLOGENY  
 FERAL, JEAN-PIERRE PHYSIOLOGY FUNCTIONAL-ANATOMY  
 FERGUSON, JOHN ECHINOIDEA NUTRITION GROWTH AQUACULTURE LAGOONAL-ENVIRONMENT-ECOLOGY  
 FERNANDEZ, CATHERINE FISHERIES-MANAGEMENT AZORES  
 FERRAZ, ROGERIO OPHIUROIDEA ECOLOGY DISTRIBUTION FEEDING BEHAVIOR  
 FERRIER, DREW FUNCTIONAL-MORPHOLOGY BIOCHEMISTRY ADHESION BIOMECHANICS  
 FLAMMANG, PATRICK CULTURE BIODIVERSITY  
 FOLLOSCO, MINDA ASTEROIDEA MOLECULAR-ANALYSES LEPTASTERIAS-COMPLEX  
 FOLTZ, DAVID ASTEROIDEA TAXONOMY  
 FONTANELLA, FRANK SYMBIOSIS DISEASE BIOASSAYS REGENERATION ASTEROIDEA  
 FORET, TIMOTHY OPHIUROIDEA LOPHELIA  
 FOSSHAGEN, HARALD TAXONOMY BIODIVERSITY ECOLOGY EVOLUTION  
 FOSTER, MERRILL OPHIUROIDEA OSSICLES BEHAVIOR  
 FOX, DAVID BIODIVERSITY ECOLOGY  
 FREEMAN, STEVEN ECHINODERMATA TAXONOMY MEXICO  
 FRONTANA URIBE, SARITA ECHINOIDEA MORPHOMETRICS  
 FRYE, BRIAN ECOLOGY TAXONOMY OPHIUROIDEA ASTEROIDEA  
 FUJITA, TOSHIHIKO DEMOGRAPHY GROWTH BIODIVERSITY  
 GAGE, JOHN ECOLOGY BEHAVIOUR BIOTURBATION TAXONOMY  
 GAGNON, JEAN-MARC CRINOIDEA PALAEOBIOLOGY  
 GAHN, FOREST ECHINOIDEA CRETACEOUS SYSTEMATICS BIOSTRATIGRAPHY PALAEOECOLOGY  
 GALLEMI, JAUME ANTARCTICA SEASONALITY REPRODUCTION  
 GALLEY, ELIZABETH ASTEROIDEA ECOLOGY BEHAVIOR FORAGING-ACTIVITY  
 GANDOLFI, SILVIA MARIA ECHINOIDEA AQUACULTURE  
 GARRISON, ROBERT HOLOTHUROIDEA TAXONOMY  
 GEBRUK, ANDREY OPHIUROIDEA POPULATION  
 GENTIL, FRANCK ECOLOGY BIOCHEMISTRY BEHAVIOUR MORPHOLOGY  
 GEORGE, SOPHIE TAXONOMY  
 GIBBS, BARBARA PALEOECOLOGY BIOTIC-INTERACTIONS DEVONIAN  
 GIBSON, MICHAEL TOXICOLOGY FEEDING-BEHAVIOR ECOLOGY OPHIUROIDEA  
 GIELAZYN, MICHEL BIODIVERSITY-&-EXTINCTION-EVENTS PALEOECOLOGY-TRENDS MORPHOLOGY PALEOBIOLOGY  
 GIL CID, MARIA DOLORES CAMBRIAN ORDOVICIAN SILURIAN  
 MUSCLE-REGENERATION-MECHANISMS  
 GINANOVA, TALIA MARICULTURE PHYTALFAUNA  
 GIRASPY, BENI MOLECULAR-BIOLOGY DEVELOPMENTAL-BIOLOGY  
 GIUDICE, GIOVANNI SYMBIOTIC-OR-PATHOGENIC-BACTERIA-COLONIZING-SEA-URCHINS  
 GIULIANO, LAURA TROPICAL-INDIAN-OCEAN  
 GLENN, KRITON C.

GLUCHOWSKI, EDWARD CRINOIDEA TAXONOMY BIOSTRATIGRAPHY PALEOECOLOGY  
 GOGGIN, LOUISE ASTEROIDEA PATHOLOGY PARASITES BIOLOGICAL-CONTROL  
 GOLDSCHMID, ALFRED ECHINOIDEA MORPHOLOGY BIODIVERSITY EVOLUTION  
 STRUCTURE-and-FUNCTION-of-AXIAL-ORGAN PODOCYTES  
 GONGADZE, GURAM ECHINOIDEA LATE-CRETACEOUS PALEOGENE EVOLUTION SYSTEMATICS PALEOBIOGEOGRAPHY  
 STRATIGRAPHY  
 GOODING, RICHARD ECHINOIDEA DIADEMATID-ASSOCIATIONS  
 GORCHAKOV, IGOR ECOLOGY PHYSIOLOGY LIFE-HISTORY  
 GOUVEIA-MONTEIRO, A.M. OPHIUROIDEA  
 GRABOWSKY-KAALALII, G. EVOLUTION BIOMECHANICS DEVELOPMENT DISPERSAL ECOLOGY  
 GREENSTEIN, BENJAMIN ASTEROIDEA ECHINOIDEA TAPHONOMY FOSSIL RECENT CROWN-OF-THORNS STARFISH  
 GREENWOOD, AMY ASTEROIDEA REPRODUCTION SEASONALITY SELF-FERTILIZATION  
 GROSJEAN, PHILIPPE ECHINOCULTURE GROWTH POPULATION-DYNAMICS MODEL PARACENTROTUS-LIVIDUS  
 GROVES, CATHY ASTEROIDEA BIOGEOGRAPHY SYSTEMATICS  
 GRYGIER, MARK PARASITOLOGY EPIZOIC-FAUNA GALLS-AND-CYSTS  
 GUDMUNDSSON, JON EGGERT ECHINOIDEA ECOLOGY POPULATION  
 GUERRAZZI, MARIA ASTEROIDEA  
 GUILLOU, MONIQUE SEA-URCHIN ECOTOXICOLOGY ECOLOGY  
 GURREA, ISIDRO ECHINOIDEA CRETACEOUS CENOZOIC WESTERN-EUROPEAN-MEDITERRANEAN-BASIN  
 GUTT, JULIAN BIODIVERSITY ECOLOGY  
 HADEL, VALERIA FLORA HOLOTHUROIDEA BIOLOGY ECOLOGY  
 HAGEN, NILS ECHINOIDEA ECOLOGY DISEASE CULTIVATION  
 HAMEL, JEAN-FRANCOIS REPRODUCTION SETTLEMENT BEHAVIOR CHEMICAL-ECOLOGY  
 HAMMER, HUGH NUTRITION GONAD GROWTH DEVELOPMENT ENZYMES  
 HAMZA HASSAN, MOHAMED ECOLOGY  
 HAND, CLAUDIA HOLOTHUROIDEA FISHERIES DISTRIBUTION  
 HARPER, FIONA EVOLUTION LIFE-HISTORY HYBRIDIZATION PHYLOGENETICS  
 HAUDE, REIMUND TAXONOMY PALEOECOLOGY EVOLUTION  
 HAVARDSSON, BJORGOLFUR ECHINOIDEA  
 HEINZELLER, THOMAS CRINOIDEA ULTRASTRUCTURE NEUROANATOMY  
 HENDLER, GORDON OPHIUROIDEA TAXONOMY BEHAVIOR FUNCTIONAL-MORPHOLOGY  
 HERDENDORF, CHARLES ABYSSAL ASTEROIDEA BRISINGIDAE ECHINOIDEA  
 HERRINGSHAW, LIAM TAXONOMY PALAEOBIOLOGY  
 HESS, HANS TAXONOMY PALEOECOLOGY CRINOIDEA ASTEROIDEA OPHIUROIDEA  
 HICKMAN, JR., CLEVELAND SYSTEMATICS ECOLOGY  
 HIGHSMITH, RAYMOND ECOLOGY REPRODUCTION COMMUNITY-ECOLOGY  
 HILL, ROBERT HOLOTHUROIDEA COMPARATIVE-PHYSIOLOGY  
 HOBERG, MAX TAXONOMY BIODIVERSITY FEEDING REPRODUCTION  
 HODGSON, ALAN ASTEROIDEA MORPHOLOGY  
 HOFFMAN, JENNIFER ECHINOIDEA LARVAE UV  
 HOLTERHOFF, PETER CRINOIDEA FOSSIL PALEOECOLOGY SYSTEMATICS  
 HOOD, SARAH TAXONOMY BIOGEOGRAPHY DEEP-WATER  
 HOOPER, ROBERT ECHINOIDEA ECOLOGY AQUACULTURE CONSERVATION  
 HOPKINS, THOMAS ASTEROIDEA ECHINOIDEA SYSTEMATICS  
 HOSHI, MOTONORI FERTILIZATION ACROSOME-REACTION GLYCOCONJUGATES  
 HOTCHKISS, FREDERICK OPHIUROIDEA STELLEROIDEA PALEOZOIC PENTAMERISM  
 HOTTENROTT, SUSAN OPHIUROIDEA TAXONOMY DEEP-SEA BIOGEOGRAPHY  
 HOWELL, KERRY ASTEROIDEA ECOLOGY REPRODUCTION DISTRIBUTION POPULATION-GENETICS  
 HUNTER, MARGARET ECHINOIDEA FISHERY-MANAGEMENT MONITORING ASSESSMENT  
 IRIMURA, SEIICHI OPHIUROIDEA TAXONOMY MORPHOLOGY ECOLOGY  
 ISHIDA, YOSHIAKI PALEOECOLOGY PHYSIOLOGY OPHIUROIDEA  
 IVY, W. GRISILDA HOLOTHUROIDEA  
 JABLONSKI, DAVID ECHINOIDEA CRINOIDEA FOSSIL  
 JACOB, UTE CIDAROIDEA  
 JACOBSEN, NANCY ASTEROIDEA TAXONOMY DISTRIBUTION REPRODUCTION  
 JAECKLE, WILLIAM LARVAE PHYSIOLOGY ECOLOGY MORPHOLOGY  
 JAGT, JOHN TAXONOMY PALAEOBIOLOGY BIOZONATION FUNCTIONAL-MORPHOLOGY  
 JAMES, DANIEL TAXONOMY ZOOGEOGRAPHY HATCHERY CULTURE  
 JAMES, DAVID ECHINOIDEA  
 JAMIESON, GLEN BIODIVERSITY HABITAT-MODIFICATION SURVEY  
 JANIES, DANIEL ASTEROIDEA EVOLUTION DEVELOPMENT  
 JEFFERIES, RICHARD P. PHYLOGENY RELATIONSHIPS-OF-PHYLA  
 JEFFERY, CHARLOTTE ECHINOIDEA-PHYLOGENIES MORPHOLOGICAL & MOLECULAR  
 ECHINOIDS-OVER-THE-K-T-BOUNDARY ECHINOID-LARVAL-STRATEGY



JELL, PETER AUSTRALIA FOSSIL PALAEOZOIC CRINOIDS ASTEROZOANS CARPOIDS RHOMBIFERA  
EDRIOASTEROIDS

JELLETT, JOANNE IMMUNITY DISEASE

JOHNSEN, SONKE PHOTORECEPTION ORIENTATION OPHIUROIDEA

JUNIO-MENEZ, ANNETTE CULTURE MANAGEMENT POPULATION-GENETICS LARVAL-ECOLOGY

JUNQUEIRA, ANDREA REPRODUCTION RECRUITMENT SETTLEMENT POPULATION-DYNAMICS

KAMMER, THOMAS CRINOIDEA PALEOZOIC TAXONOMY EVOLUTION PALEOECOLOGY

KASYANOV, VLADIMIR ASTEROIDEA REPRODUCTION CELLULAR-MECHANISMS

KAWAUCHI, GISELE YUKIMI HOLOTHUROIDEA APODIDA REPRODUCTION DISPERSION

KELLER, BRIAN ECHINOIDEA ECOLOGY

KELLEY, SCOTT ECHINOIDEA-TAXONOMY-ONTOGENY CRETACEOUS-COMATULID-BIODIVERSITY

KELLY, MAEVE ECHINOCULTURE PSAMMECHINUS-MILIARIS NUTRITION GROWTH

KERR, ALEXANDER HOLOTHUROIDEA PHYLOGENY EVOLUTION SYSTEMATICS

KINJO, SONOKO ECHINOMETRA LARVAL-SKELETON EVOLUTION

KLIKUSHIN, VLADIMIR TAXONOMY PALEOBIOLOGY

KLINGER, THOMAS ECHINOIDEA HOLOTHUROIDEA NUTRITION ECOLOGY

KNOTT, K. EMILY ASTEROIDEA SYSTEMATICS DEVELOPMENTAL-EVOLUTION

KOBAYASHI, NAOMASA ECHINOIDEA MARINE-POLLUTION BIOASSAY SPAWNING-PERIODICITY

KOGO, ICHIZO TAXONOMY DISTRIBUTION PHYLOGENY EXISTING-CRINOIDEA

KRISHNARAJAH, PADMINI HOLOTHUROIDEA TAXONOMY FOOD-HABITS REPRODUCTIVE-BIOLOGY

KROH, ANDREAS ECHINOIDEA TERTIARY TAXONOMY PALAEOECOLOGY

KROHLING, WERTHER PALAEOBIOGEOGRAPHY TAPHONOMY PARATETHYS MEDITERRANEAN-REGION

KYTE, MICHAEL BENTHIC-ECOLOGY MARINE-ECOLOGY BIOGEOGRAPHY

LACEY, KATRINA OPHIUROIDEA ASTEROIDEA SYSTEMATICS TAXONOMY BEHAVIOR NORTHEAST-PACIFIC

LAMBERT, PHILIP HOLOTHUROIDEA

LANDEIRA FERNANDEZ, A.M. SYSTEMATICS HOLOTHUROIDEA TAXONOMY NATURAL-HISTORY

LANE, N. GARY SEA-CUCUMBER-SMOOTH-MUSCLE Ca<sup>2+</sup>-ATPase Ca<sup>2+</sup>-transport

LAWRENCE, JOHN CRINOIDEA PALEOZOIC

LE MENN, JEAN NUTRITION REPRODUCTION REGENERATION AQUACULTURE ECOLOGY

LEE, YOUN-HO SYSTEMATICS PALEOBIOLOGY PALEOECOLOGY PALEOBIOGEOGRAPHY BIOSTRATIGRAPHY

LEFEBVRE, BERTRAND EVOLUTION EMBRYOLOGY DEVELOPMENT

LELAND, AMANDA PALEOZOIC STYLOPHORANS EOCRINOIDS PALEOBIOLOGY PALEOECOLOGY

LEMBO, LUIZ TROPHIC-EFFECTS TAXONOMY GLOBAL-DISTRIBUTIONS/ABUNDANCES

LESSER, MICHAEL CRINOIDEA

LESSIOS, HARILAOS ECHINOIDEA

LEVERONE, JAY ECHINOIDEA PHYLOGENY POPULATION-GENETICS

LEVIN, VALERY ASTEROIDEA REPRODUCTION

LEWIS, DAVID SHALLOW-WATER-HOLOTHUROIDEA SYSTEMATICS BIOLOGY FEEDING FISHERIES

LHEKNIM, VACHIRA PALAEOONTOLOGY ECHINOIDEA

LIAO, YULIN TAXONOMY GULF-OF-THAILAND ANDAMAN-SEA

LINDSTROM, DAWN OPHIUROIDEA HOLOTHUROIDEA TAXONOMY MARICULTURE

LITVINOVA, NINA PREDATION OPHIOCOMA-ECHINATA

LORDSON, JINBERT OPHIUROIDEA TAXONOMY MORPHOLOGY BEHAVIOUR ECOLOGY

MACURDA, JR., D.B. HOLOTHUROIDEA

MACZYNSKA, STEFANIA TAXONOMY PALEOGEOGRAPHY CRINOIDEA

MAGSINO, RICHARD ECHINOIDEA MIOCENE PARATETHYS-BASIN MEDITERRANEAN

MAH, CHRISTOPHER POPULATION-GENETICS ASTEROIDEA

MAHARAVO, JEAN ASTEROIDEA GONIASTERIDAE FORCIPULATES ASTERIIDAE BRISINGIDA PHYLOGENETICS

MAIER, MARTA TAXONOMY FEEDING ECOLOGY MESOZOIC CENOZOIC SYSTEMATICS DEEP-SEA INDIAN-OCEAN

MAKRA, ATHENA PACIFIC-OCEAN

MALDONADO, ELISA M. TAXONOMY BIOLOGY BIODIVERSITY

MALLEFET, JEROME POLAR-METABOLITES BIOLOGICAL-ACTIVITY ISOLATION STRUCTURAL-ELUCIDATION

MANIKANDAN K.P., POPULATION-DYNAMICS BEHAVIOUR REPRODUCTION REGENERATION

MANNI, RICCARDO ECOLOGY CRINOIDEA OPHIUROIDEA PARASITISM

MANNIFIELD, KAY BIOLUMINESCENCE PHYSIOLOGY NEUROBIOLOGY FUNCTIONAL-ECOLOGY

MANSO, CYNTHIA HOLOTHUROIDEA EMBRYOLOGY HATCHERY

MAPLES, CHRISTOPHER SYSTEMATICS MORPHOLOGICAL-FUNCTIONALITY CYRTOCRINID-crinoids

MARAN, ALEKSANDRA PALAEOECOLOGY TAXONOMY TAPHONOMY BIODIVERSITY-(+EXTINCTIONS)

MARCUS, SARA OPHIUROIDEA ECHINOIDEA TAXONOMY CRETACEOUS

MARQUARDT, LUCIE DEVONIAN CARBONIFEROUS MISSISSIPPIAN PENNSYLVANIAN PERMIAN PALEOECOLOGY

PALEOBIOGEOGRAPHY CRINOID BLASTOID MICROCRINOID

ECHINOIDEA CRETACEOUS SYSTEMATICS BIOSTRATIGRAPHY PALAEOECOLOGY TAPHONOMY

PALEOZOIC-CRINOIDS 'MICROCRINOIDS'

ASTEROIDEA ANTARCTICA TROPHIC-POSITION ENERGY-FLOW RESPIRATION REPRODUCTION

MARSH, LOISETTE  
MARTIN, RICHARD  
MARTINEZ, PRISCILLA  
MARTINEZ, SERGIO  
MASCARENHAS, BERNARDO  
MASON, JOANNE  
MASSIN, CLAUDE  
MATA PEREZ, EUSTOLIA  
MATERIA-ROWLAND, C.  
MATIAS, MIGUEL  
MATTOS-SEGOVIA, ELIO  
MAUBON, ROGER  
McBRIDE, SUSAN  
McCLINTOCK, JAMES  
McEDWARD, LARRY  
McEUEEN, F. SCOTT  
MCGOVERN, TAMARA  
McKENZIE, J. DOUGLAS  
McLELLAND, JERRY  
McNAMARA, KENNETH  
MEDEIROS-BERGEN, DOT  
MELIKOV, OKTAY HAMZA  
MERCIER, ANNIE  
MESSING, CHARLES  
MEYER, CHRISTIAN  
MEYER, DAVID  
MEZALI, KARIM  
MILLER, ROBERT  
MINER, BEJAMIN  
MINTZ, LEIGH  
MIRONOV, ALEXANDER  
MITROVIC-PETROVIC, J.  
MLADENOV, PHILIP  
MONTAGUE, CHRISTOPHER  
MOOI, RICHARD  
MOONEY, ROBERT  
MOORE, ABIGAIL  
MORGAN, ANDREW  
MORGAN, KATHERINE  
MORGAN, RAPHAEL  
MORRILL, JOHN  
MOTOKAWA, TATSUO  
MULLER, CLARE  
MUNK, ERIC  
MUSA, NADIRAH  
NAIDENKO, TAMARA  
NAKAI, SAORI  
NATARAJAN, P.  
NEBELSICK, JAMES  
NEILL, BRUCE  
NEPOTE, ANA CLAUDIA  
NESTLER, HELMUT  
NEUMANN, CHRISTIAN  
NICHOLS, DAVID  
NICOSIA, UMBERTO  
NISHIHIRA, MORITAKA  
NISHIZAKI, MICHAEL  
NOJIMA, SATOSHI  
O'CONNOR, BRENDAN  
ASTEROIDEA TAXONOMY ECHINODERM-BIOGEOGRAPHY AUSTRALIA INDO-WEST-PACIFIC  
NONINDIGENOUS-MARINE-SPECIES INTRODUCTION-AND-TRANSLOCATION-VECTORS  
MARINE-PEST-INFORMATION-SYSTEMS  
HOLOTHUROIDEA REPRODUCTION LARVAL-BIOLOGY  
PALEONTOLOGY TAXONOMY PALEOECOLOGY ECHINOIDEA  
ASTEROIDEA ECOLOGY TAXONOMY POPULATION-DYNAMICS  
ASTEROIDEA BIODIVERSITY BEHAVIOUR ECOLOGY  
HOLOTHUROIDEA TAXONOMY ZOOGEOGRAPHY EVOLUTION  
ECHINODERMATA ASTEROIDEA LUIDIIDAE MEXICO TAXONOMY  
TAXONOMY BIODIVERSITY ECOLOGY  
ECHINOIDEA  
ECHINOIDEA LARVAE REPRODUCTION EMBRYOLOGY DEVELOPMENT  
SYSTEMATICS ECHINOIDEA  
SEA-URCHIN NUTRITION REPRODUCTION  
CHEMICAL-ECOLOGY REPRODUCTION NUTRITION ECOLOGY  
LARVAL-ECOLOGY LIFE-CYCLE-EVOLUTION  
HOLOTHUROIDEA REPRODUCTION TAXONOMY DEVELOPMENT ECOLOGY  
OPHIACTIS FISSION REPRODUCTION GENDER-SPECIFIC  
BACTERIAL-SYMBIONTS CELL-CULTURES SURFACE-COATS  
TAXONOMY BIODIVERSITY GULFOFMEXICO WESTINDIES  
ECHINOIDEA PALEONTOLOGY PHYLOGENY  
LIFE-HISTORY-TACTICS RECRUITMENT LARVAL-MOLECULAR-IDENTIFICATION  
ECHINOIDEA EVOLUTION MORPHOLOGY HOLASTEROID SPATANGOID JURASSIC CRETACEOUS  
EOCENE  
REPRODUCTION SETTLEMENT BEHAVIOUR CHEMICAL-ECOLOGY TOXICOLOGY  
CRINOIDEA ECOLOGY BIOGEOGRAPHY SYSTEMATICS  
MESOZOIC-ECHINODERMS PALEOBIOLOGY TAPHONOMY  
CRINOIDEA PALEOZOIC MESOZOIC CENOZOIC RECENT REEFS PALEOECOLOGY  
FUNCTIONAL-MORPHOLOGY TAPHONOMY  
CARYOLOGY ECOLOGY LIFE-CYCLES NUTRITION HOLOTHUROIDEA  
BIOGEOGRAPHY EVOLUTION FISHERY ECOLOGY  
ECHINOIDEA LARVAE PLASTICITY  
EARLY-PALEOZOIC-FORMS ORIGIN-&-EARLY-EVOLUTION  
TAXONOMY BIOGEOGRAPHY CRINOIDEA ASTEROIDEA ECHINOIDEA HOLOTHUROIDEA  
TAXONOMY PALEOECOLOGY MORPHOLOGY EVOLUTION ECHINOIDEA  
REPRODUCTION GENETICS ECOLOGY AQUACULTURE FISHERIES  
ASTEROIDEA REGENERATION FISHERIES  
ECHINOIDEA  
COMMUNITY-ECOLOGY INTRASPECIFIC-COMPETITION  
BIODIVERSITY SUSTAINABLE-EXPLOITATION  
HOLOTHUROIDEA FISHERIES DEVELOPMENT REPRODUCTION  
LIFE-CYCLE-EVOLUTION  
OPHIUROIDEA  
ECHINOIDEA DEVELOPMENT  
CATCH-CONNECTIVE-TISSUE STALKED-CRINOIDS  
HOLOTHUROIDEA TAXONOMY ECOLOGY  
GROWTH REPRODUCTION  
HISTOLOGY HOLOTHUROIDEA  
ECHINOIDEA METAMORPHOSIS POLLUTION BIOASSAY CRYOPRESERVATION  
ECHINOIDEA TAXONOMY  
MARICULTURE FRESH-WATER-CULTURE-OF-FIN-AND-SHELL-FISH  
ECHINOIDEA ECOLOGY PALAEOBIOLOGY TAPHONOMY BIODIVERSITY  
BIOGEOGRAPHY ECHINOMETRIDS GENETICS SYSTEMATICS  
BIODIVERSITY ECOLOGY EVOLUTION  
ECHINOIDEA CRETACEOUS TAXONOMY PALEOECOLOGY  
ECHINOIDEA SPATANGOIDA TAXONOMY ECOLOGY  
FUNCTIONAL-MORPHOLOGY REPRODUCTIVE-STRATEGIES  
SYSTEMATICS PALAEOECOLOGY JURASSIC-CRINOIDS; EVOLUTION STRATIGRAPHY  
NON-ISOCRINID CRINOIDS  
ECOLOGY BIODIVERSITY POPULATION BEHAVIOR  
ECHINOIDEA RECRUITMENT ECOLOGY JUVENILES SHELTERING  
SEA-STAR SEA-URCHIN LIFE-HISTORY-TACTICS PREDATION-PRESSURE  
ECOLOGICAL-ENERGETICS  
OPHIUROIDEA TAXONOMY BIOTURBATION DENSITY-REGULATORY-FACTORS

O'HARA, TIMOTHY  
O'LOUGHLIN, P. MARK  
OHTA, SUGURU  
OJEDA, F. PATRICIO  
OJI, TATSUO  
OLIVARES CARDENAS, M.  
OLSZEWSKA-NEJBERT, D.  
OLVER, JANE  
PABIAN, ROGER  
PAGETT, RICHARD  
PALUMBI, STEVE  
PARDO ANGEL, ROBERTO  
PARMA, SARA GRACIELA  
PARSLEY, RONALD  
PAULS, SHEILA MARQUES  
PAWSON, DAVID  
PAYNE, ADAM  
PEARCE, CHRIS  
PENCHASZADEH, PABLO  
PEREIRA MAJER, A.  
PETR, VACLAV  
PETROVA, IRINA  
PHILIPPE, MICHEL  
PIEPENBURG, DIETER  
PODOLSKY, ROBERT  
PORTELL, ROGER  
PRESTEDGE, GEOFFREY  
PROKOP, RUDOLF JAN  
PUTCHAKARN, SUMAITT  
RAJAKUMAR, C.  
RAM MOHAN, M.

REGIS, MARIE-BERTHE  
REICH, MIKE  
REMPALA, ERIN  
RINELLI, PAOLA  
RINGVOLD, HALLDIS  
ROBERTS, SARAH  
ROBINSON, SHAWN

ROCCATAGLIATA, A.  
RODRIGUEZ, SEBASTIAN  
ROGERS-BENNETT, LAURA  
ROSE, EDWARD  
ROTMAN CLARK, HELEN  
ROUX, MICHEL  
ROWE, FRANK  
ROY, MICHAEL

RUBILAR PANASIUK, C.T.  
RUENGSAWANG, NISIT  
SABA, MASAKI  
SADLER, KIRSTEN  
SAHA, APURBA KUMAR  
SALAMON, MARIUSZ A.  
SAMYN, YVES

SANFORD, ERIC  
SANO, MINORU  
SANTOS, JOCO FARIA  
SASTRY, DWADASI  
SAUCEDE, THOMAS  
SCALLY, KEVIN  
SCHEIN, JASON

TAXONOMY NATURAL-HISTORY BIOGEOGRAPHY CONSERVATION  
HOLOTHUROIDEA TAXONOMY  
TAXONOMY DEEP-SEA ECOLOGY HOLOTHURIA ECHINODERMS  
ECOLOGY BIOLOGY FEEDING-BIOLOGY DISTRIBUTION  
CRINOIDEA TAXONOMY EVOLUTION BIOGEOGRAPHY REGENERATION  
HOLOTHUROIDEA TAXONOMY  
CRETACEOUS-IRREGULAR-ECHINOIDS PALEOBIOGEOGRAPHY STRATIGRAPHY  
ECOLOGY RECENT-&-FOSSIL BRITISH ECHINOIDEA  
CRINOIDEA-EPIBIONTS PARASITES PREDATORS COMMENSALS  
BRACKISH-WATER-ECOLOGY CASPIAN SEA  
ECHINOIDEA SPECIATION POPULATIONS-STRUCTURE MOLECULAR-EVOLUTION  
ECOLOGY POPULATION-DYNAMICS ECHINOIDEA OPHIUROIDEA  
PALEOBIOGEOGRAPHY ECHINOIDEA MESOZOIC-CENOZOIC  
ANKYROIDS CORNUTES STYLOPHORA HOMALAZOA CYSTOID-groups  
TAXONOMY ECOLOGY MORPHOLOGY  
SYSTEMATICS ECHINOIDEA HOLOTHUROIDEA  
OPHIUROIDEA ECOLOGY PREDATION  
URCHIN CULTURE ENHANCEMENT PREPARED-FEEDS  
ASTEROIDEA ECHINOIDEA HOLOTHUROIDEA NUTRITION REPRODUCTION  
HOLOTHUROIDEA APODA REPRODUCTION BEHAVIOR  
SYSTEMATICS TAXONOMY PALEOBIOLOGY PALEOECOLOGY BIOSTRATIGRAPHY  
MORPHOLOGY  
ECHINOIDEA PALEOECOLOGY STRATIGRAPHY TAXONOMY  
ECOLOGY OPHIUROIDEA BIODIVERSITY  
REPRODUCTION FERTILIZATION LARVAL-BIOLOGY PHYSIOLOGY BIOCHEMISTRY  
ECHINOIDEA ASTEROIDEA TAXONOMY BIODIVERSITY  
PATRIELLA-VIVIPARA  
EARLY-PALAEZOIC-ECHINODERMATA BIOSTRATIGRAPHY PALEOBIOLOGY  
TAXONOMY ECOLOGY BIODIVERSITY  
BIOLOGY ECOLOGY  
HOLOTHUROIDEA REPRODUCTIVE-BIOLOGY LARVAL-DEVELOPMENT ASEXUAL-REPRODUCTION  
REGENERATION  
BIOLOGY ECOLOGY POLLUTION ENVIRONMENT  
TAXONOMY MORPHOLOGY EVOLUTION FOSSIL-HOLOTHUROIDEA OPHIOCISTIOIDEA  
ASTEROIDEA EVOLUTION SYSTEMATICS  
BIOGEOGRAPHY ECOLOGY BIODIVERSITY  
ASTEROIDEA TAXONOMY DISTRIBUTION  
MARINE-BIOLOGY ECHINODERMS  
SEA-URCHINS CULTURE ENHANCEMENT FISHERY ECOLOGY LARVICULTURE  
STRONGYLOCENTROTUS  
ASTEROIDEA OPHIUROIDEA PHYSIOLOGICALLY-ACTIVE-STEROIDS  
ECHINOIDEA ECOLOGY SPATIAL-DISTRIBUTION USE-OF-DRIFT-ALGAE  
ECHINOIDEA GROWTH  
FOSSIL ECHINOIDEA  
ASTEROIDEA TAXONOMY ANATOMY  
CRINOIDEA TAXONOMY ECOLOGY BIOGEOGRAPHY  
ECHINODERMATA SYSTEMATICS ZOOGEOGRAPHY EVOLUTION  
EVOLUTIONARY-GENETICS CONSERVATION-GENETICS PHYLOGEOGRAPHY  
HUMAN-AIDED-MARINE-INTRODUCTIONS MARINE-SPECIATION NEW-ZEALAND-FIORDS  
ASTEROIDEA BIOCHEMISTRY  
ECOLOGY  
ASTEROIDEA TAXONOMY  
STARFISH MEIOSIS  
ASTEROIDEA  
CRINOIDEA TRIASSIC  
TAXONOMY FEEDING-BIOLOGY REPRODUCTIVE-BIOLOGY HOLOTHUROIDEA  
ECHINOIDEA-REGULAR  
ECOPHYSIOLOGY ECOLOGY BIOGEOGRAPHY ASTEROIDEA  
ECHINOIDEA POPULATION-ECOLOGY  
ECHINOIDEA  
TAXONOMY ECOLOGY ECHINODERMATA CORAL-REEFS SYMBIONTS  
PRIMITIVE-IRREGULAR-SEA-URCHINS  
MASTECATORY-FUNCTION ECOLOGY DENTAL-MORPHOLOGY EVOLUTION  
ECHINOIDEA

SCHELTEMA, RUDOLF  
 SCHOPPE, SABINE  
 SCHUETZ, ALLEN  
 SCHUHMACHER, HELMUT  
 SCHULTZ, HEINKE  
 SEETO, JOHNSON  
 SERAFY, D. KEITH  
 SEVASTOPULO, GEORGE  
 SEWELL, MARY  
 SHEPHERD, SCORESBY  
 SHICK, J. MALCOLM  
 SHIRLEY, THOMAS  
 SIBUET, MYRIAM  
 SINGLETARY, ROBERT  
 SKOLD, MATTIAS  
 SLOAN, NORMAN  
 SMILEY, SCOTT  
 SMIRNOV, ALEXEI  
 SMIRNOV, IGOR  
 SMITH, ALBERT  
  
 SMITH, ANDREW  
 SMITH, L. COURTNEY  
 SMITH, MICHAEL  
 SOLANDT, JEAN-LUC  
 SOLIS-MARIN, FRANCISCO  
  
 SOLOVJEV, ANDREY  
 SONNENHOLZNER, JORGE  
 SOUSA, RUI  
 SPENCER, LARRY  
 SPIRINA, IRINA  
 SPIRLET, CHRISTINE  
 SPONER, RENATE  
 STANCYK, STEPHEN  
 STARMER, JOHN  
 STEWART, BRIAN  
 STICKLE JR., WILLIAM  
 STOEHR, SABINE  
 STORC, RICHARD  
 STRATHMANN, RICHARD  
 STUMP, RICHARD  
 SU, XIAOWEI  
 SUMRALL, COLIN  
 SUTER, SHERMAN  
 TABLADO, ALEJANDRO  
 TAHERA, QASEEM  
 TAKAHASHI, KEIICHI  
 TALBOT, TIFFANY  
 TAVARES, YARA A.  
 THANDAR, AHMED  
 THAPANAND, THANITHA  
 THIERRY, JACQUES  
 THORNDYKE, MICHAEL  
 THORSEN, MARIANNE  
 TIAGO, CLAUDIO G.  
 TOMINAGA, HIDEYUKI  
  
 TOMMASI, LUIZ ROBERTO  
 TRONCOSO, JUAN  
 TURNER, RICHARD  
 TURON, XAVIER  
 TUTERA, PETER  
 UBAGHS, GEORGES  
  
 LARVAL-DISPERSAL MODE-OF-REPRODUCTION  
 OPHIUROIDEA SEA-CUCUMBER-FISHERY INTERSPECIFIC-RELATIONSHIPS  
 JUVENILES  
 TAXONOMY ECOLOGY BIOEROSION  
 BROODING-SCHIZASTERIDS TAXONOMY BIOLOGY ECOLOGY  
 TAXONOMY REPRODUCTION  
 ECHINOIDEA TAXONOMY LIFE-HISTORY AGE/GROWTH-STUDIES ZOOGEOGRAPHY  
 PALEONTOLOGY PHYLOGENY FUNCTIONAL-MORPHOLOGY CRINOIDEA  
 HOLOTHUROIDEA BIOGEOGRAPHY LARVAL-ECOLOGY LARVAL-DEVELOPMENT REPRODUCTION  
 ECHINOIDEA CULTURE  
 PHYSIOLOGY PHOTOBIOLOGY BIOCHEMISTRY DEVELOPMENT  
 CRAB-ASTEROID-INTERACTIONS  
 TAXONOMY BIODIVERSITY  
 ECOLOGY TAXONOMY  
 OPHIUROIDEA REGENERATION DEVELOPMENT  
 HOLOTHUROIDEA FISHERIES  
 HOLOTHUROIDEA PHYSIOLOGY DEVELOPMENT EVOLUTION  
 TAXONOMY ZOOGEOGRAPHY EVOLUTION PHYLOGENY PALEONTOLOGY HOLOTHUROIDEA  
 POLAR-OCEANS OPHIUROIDEA DATABASES  
 PATHOLOGY/PATHOBIOLOGY HEMATOLOGY IMMUNE-SYSTEM  
 LINKS-TO-PROTOCHORDATES/VERTEBRATES  
 PALAEOBIOLOGY SYSTEMATICS  
 URCHIN-MOLECULAR-IMMUNOLOGY-EVOLUTION-COMPLEMENT  
 MOLECULAR-PHYLOGENETICS LARVAL-LIFE-HISTORY-STRATEGIES  
 DIADEMA HERBIVORY CORAL-REEFS  
 ECOLOGY MOLECULAR-TAXONOMY NORTH-ATLANTIC HOLOTHUROIDEA ECHINOIDEA  
 OPHIUROIDEA TAXONOMY  
 ECHINOIDEA EVOLUTION PALEOECOLOGY  
 ECHINOIDEA ECOLOGY DISEASE IMMUNE-RESPONSE  
 OPHIUROIDEA ECOLOGY BIODIVERSITY  
 POPULATION-ECOLOGY SYMBIOTIC-RELATIONSHIPS LIFE-HISTORY-STUDIES  
 MORPHOLOGY REGENERATION HOLOTHUROIDEA  
 SEA-URCHIN ECHINICULTURE REPRODUCTION GONAD-GROWTH  
 EVOLUTION GENETICS BIODIVERSITY BIOGEOGRAPHY  
 OPHIUROIDEA REGENERATION PREDATION POPULATION GROWTH  
 OPHIUROIDEA TAXONOMY BIOGEOGRAPHY SYMBIOSIS-(with octocorals)  
 OPHIUROIDEA REPRODUCTION ANATOMY PHYSIOLOGY  
 PHYSIOLOGY TOLERANCE ASTEROIDEA  
 OPHIUROIDEA BIODIVERSITY PHYLOGENY  
 OPHIUROIDEA ASTEROIDEA TAXONOMY CRETACEOUS  
 LARVAE EVOLUTION BODY-PLANS  
 CELL-BIOLOGY LIFE-HISTORY POPULATION-DYNAMICS AGE-DETERMINATION  
 SEA-URCHIN-SPINE NATURAL-COMPOSITES  
 PHYLOGENY SYSTEMATICS PALEOECOLOGY EDRIOASTEROID  
 ECHINOIDEA PALAEOBIOLOGY  
 ASTEROIDEA TAXONOMY SOUTH-ATLANTIC  
 BIODIVERSITY BIOLOGY LARVAL-DISTRIBUTION POPULATION-DYNAMICS  
 MUSCLE-PHYSIOLOGY SPERM-MOTILITY CONNECTIVE-TISSUE  
 OPHIUROIDEA REPRODUCTION DEVELOPMENT BEHAVIOR FUNCTIONAL-MORPHOLOGY  
 ECHINOIDEA ECOLOGY REPRODUCTION POPULATION-DYNAMICS MORPHOMETRY  
 HOLOTHUROIDEA TAXONOMY SYSTEMATICS ZOOGEOGRAPHY REPRODUCTIVE-BIOLOGY  
 POPULATION-DYNAMICS FISH-AND-INVERTEBRATES  
 BIODIVERSITY EVOLUTION MORPHOLOGY  
 NEUROBIOLOGY REGENERATION DEVELOPMENT  
 ECHINOIDEA GUT-MICROBIOTA  
 BIOLOGY ECHINODERMS  
 BRITTLE-STAR SEXUAL-DIMORPHINISM DEVELOPMENT SAND-DOLLARS-(as-their-host)  
 TAXONOMY  
 OPHIUROIDEA SYSTEMATICS ANTARCTICA PALAEOBIOGEOGRAPHY BIOGEOGRAPHY  
 TAXONOMY ANTARCTIC  
 SYSTEMATICS MORPHOLOGY REPRODUCTION PHYSIOLOGICAL-ECOLOGY  
 REPRODUCTIVE-BIOLOGY RECRUITMENT POPULATION-DYNAMICS ECOTOXICOLOGY  
 TAXONOMY BIODIVERSITY CONSERVATION  
 LOWER-PALAEOZOIC-ECHINODERMS CRINOIDS CARPOIDS

UTHICKE, SVEN	HOLOTHUROIDEA POPULATION-GENETICS ASEXUAL-REPRODUCTION INTERACTIONS-WITH-ENVIRONMENT
v. JUTERZENKA, KAREN	OPHIUROIDEA ARCTIC-ECHINODERMS-ECOLOGY FEEDING-STRATEGIES POPULATION-DYNAMICS
VADAS, ROBERT	GRAZING BEHAVIOR REPRODUCTIVE-ECOLOGY
VADET, ALAIN	ECHINOIDEA TAXONOMY EVOLUTION VARIATION ADAPTATION
VALENTINE, JOE	ECHINOIDEA ECOLOGY
VALENTINE, JOHN	OPHIUROIDEA ECHINOIDEA ECOLOGY
VAN DER HAM, RAYMOND	ECHINOIDEA CAMPANIAN-MAASTRICHTIAN-DANIAN NW-EUROPE TAXONOMY
VAN HOUT, TESSA	ECOLOGY DISTRIBUTION BEHAVIOUR BIO-EROSION
VANDENSPIEGEL, DIDIER	DEFENSIVE-MECHANISMS MORPHOLOGY SYMBIOSIS
VAROTTO, RICARDO	TAXONOMY ECOLOGY PHYSIOLOGY
VEATCH, STEVEN	ECHINOIDEA FOSSILS
VEGA, JUAN TORRES	OPHIUROIDEA ECHINOIDEA SYSTEMATICS
VELARDE, RONALD	TAXONOMY DISTRIBUTIONAL-ECOLOGY SYMBIOTIC-RELATIONSHIPS
VENTURA, CARLOS RENATO	REPRODUCTION ASTEROIDEA
VERLING, EMMA	ECHINOIDEA ASTEROIDEA BEHAVIOUR ECOLOGY NICHE-PLASTICITY
VIADA, STEPHEN	TAXONOMY BIODIVERSITY BIOGEOGRAPHY
VICKERY, MINAKO	ASTEROIDEA MOLECULAR-PHYLOGENY
VIKTOROVSKAYA, GALINA	REPRODUCTION INVERTEBRATES BIOTIC-ABIOTIC-CONDITIONS
VILLIER, LOIC	ASTEROIDEA SPATANGOIDA TAXONOMY PHYLOGENY
VISTISEN, BODIL	OPHIUROIDEA
VOLBEHR, UTE	ECOLOGY
von BRAND, ELISABETH	HOLOTHUROIDEA CYTOGENETICS POPULATION-GENETICS
WALKER, CHARLES	SEASTAR SEA-URCHIN GAMETOGENESIS ULTRASTRUCTURE VITELLOGENIN SIGNAL-TRANSDUCTION-PATHWAYS MAP-KINASE STEROIDS c-myc p53 c-ras LAND-BASED-AQUACULTURE SBIR
	SEA-URCHIN LARVAL-CULTURE LYTECHINUS-VARIEGATUS
WALLACE, BRENDA	ECHINOIDEA REPRODUCTION
WASSON, KRISTINA	GROWTH REPRODUCTION NUTRITION PHYSIOLOGY HORMONES
WATTS, STEPHEN	CRINOIDEA PALEOZOIC TAXONOMY PALEOBIOGEOGRAPHY
WEBSTER, GARY	CRINOIDEA MORPHOLOGY NERVOUS-SYSTEM CONNECTIVE-TISSUE
WELSCH, ULRICH	CRINOIDEA LARVAL-BIOLOGY TAXONOMY SENSORY-BIOLOGY
WHITE, CHRIS	CRINOIDEA TAXONOMY PALAEOBIOGEOGRAPHY PHYLOGENY PALAEOZOIC
WIDDISON, ROSANNE	REPRODUCTIVE-BIOLOGY POPULATION-GENETICS ECOLOGY HOLOTHUROIDEA
WIGHAM, BEN	OPHIUROIDEA ECHINOIDEA FUNCTIONAL-MORPHOLOGY
WILKIE, IAIN	POPULATION-GENETICS MOLECULAR-PHYLOGENY EXPRESSED-GENES
WILLCOX, MARK	CHEMICAL-ECOLOGY LARVAL-BIOLOGY HERBIVORY LIFE-HISTORY
WILLIAMSON, JANE	ZOOGEOGRAPHY AZORES
WIRTZ, PETER	ECHINOIDEA TAPHONOMY ECOLOGY ACTUOPALEONTOLOGY
WORHEIDE, GERT	EVOLUTION DEVELOPMENT PHYLOGENETICS
WRAY, GREGORY	LARVAL-DEVELOPMENT BIOGEOGRAPHY
YAMAGUCHI, MASASHI	METAMORPHOSIS ECHINOIDEA DEVELOPMENT
YANAGISAWA, TOMIO	HOLOTHURIA
YEVDOKIMOV, ALEXANDR	PHYLOGENY MORPHOGENESIS EMBRYOGENESIS
YOKOTA, YUKIO	COLLAGEN EXTRACELLULAR-MATRIX ELM
YOSHIZATO, KATSUTOSHI	PIGMENT CAROTENOIDS ECHINODERMATA FEEDING
ZADOROZHNY, PAVEL	TAXONOMY BIODIVERSITY ECOLOGY DISTRIBUTION
ZAVODNIK, DUSAN	TAXONOMY ASTEROIDEA
ZEIDLER, WOLFGANG	TAXONOMY TAPHONOMY PALEOECOLOGY
ZITT, JIRI	

☆☆☆☆ ECHINODERM WEB PAGES ☆☆☆☆

Larry Basch, Ecologist--Coastal Manager  
National Park Service  
Alaska Southeast Coastal Parks Cluster:  
Glacier Bay, Klondike Gold Rush, Sitka, & Wrangell-St. Elias National Parks  
Larry\_Basch@nps.gov  
sealives@seaknet.alaska.edu  
<http://www.nps.gov/glba/>  
<http://www.nps.gov/klgo/>  
<http://www.nps.gov/sitk/>  
<http://www.nps.gov/wrst/home.html>

Penny Berents - Collection Manager - Marine Invertebrates - Australia  
<http://www.austmus.gov.au>

Christiane Biermann - <http://faculty.washington.edu/biermann/>  
Includes some samples of my research on fertilization and population genetics in stronglylocotroids and echinids.

David Billett - <http://www.soc.soton.ac.uk/GDD/DEEPSEAS>  
DEEPSEAS Benthic Biology Group at Southampton Oceanography Centre

Ruediger Birenheide - [www.birenheide.com/cemb](http://www.birenheide.com/cemb)  
Canadian Echinoderm Message Board - set up to encourage conversation between Canadian and all other interested echinoderm scientists.

Francesco Bonasoro - <http://imiucca.csi.unimi.it/~echino/Sece7.htm>

Thomas Brey - <http://www.awi-bremerhaven.de>  
Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany

Peter Brueggeman - Scripps Institution of Oceanography Library  
<http://scilib.ucsd.edu/sio/nsf/guide/echinodermata-1.html>  
<http://scilib.ucsd.edu/sio/nsf/guide/echinodermata-2.html>  
McMurdo Sound, Antarctica echinoderms

Ron Clouse - <http://www.clouseart.com/>

Chantal Conand - [http://www.univ-reunion.fr/t10\\_fac\\_sciences/t10\\_plaquette/ecomar.htm](http://www.univ-reunion.fr/t10_fac_sciences/t10_plaquette/ecomar.htm)  
Beche de Mer Bulletin (SPC) - [www.spc.org.nc/coastfish](http://www.spc.org.nc/coastfish)

Costello, Mark J. - developing a European Register of Marine Species: details at web site  
[erms.biol.soton.ac.uk](http://erms.biol.soton.ac.uk)

Costello, Mark J. - Ecological Consultancy Services Ltd (EcoServe) at [www.ecoserve.ie](http://www.ecoserve.ie)

Dafni, J. - [www.dafni.com/gulfsave/jdafni.html](http://www.dafni.com/gulfsave/jdafni.html)

Claire Dalglish - Our company is currently working with macrobenthos sampled from the North East Atlantic margin, mainly in the Faroe-Shetland channel as part of environmental monitoring programmes within the oil and gas industry, UK. Environment and Resource Technology's Homepage offering an introduction to a wide range of inhouse environmental capabilities at [www.ert.co.uk](http://www.ert.co.uk)

Yannick Dewael - <http://lifesci.ucsb.edu/~biolum/forum/ydewael1.html>  
My page on the bioluminescence web site.

Samuel Dupont -

1/ Summary of my PhD project

<http://lifesci.ucsb.edu/~biolum/forum/sdupont1.html>

2/ Personal page and Curriculum vitae (Update 20 March 2000)

<http://www.biol.ucl.ac.be/fyga/Dupont.html>

3/ Web page of the Animal Physiology lab

<http://www.biol.ucl.ac.be/fyga/>

Also, from Sam Dupont

Results of project on the small bioluminescent ophiuroid *Amphipholis squamata* presented at the **11th International Symposium on Bioluminescence and Chemiluminescence**.

Oral communication presented as a web page.

I invite you to visit <http://www.biol.ucl.ac.be/fyga/californie/page1.html>

Ebert, T. A. 1998. Plant and Animal Populations. Methods in Demography. Academic Press, San Diego, CA 312p The book includes various echinoderm examples for illustrating analysis of growth, survival, allometry and matrix methods; see [http://www.sci.sdsu.edu/Cornered\\_Rat/](http://www.sci.sdsu.edu/Cornered_Rat/)

Jon Eggert - (contact: [midvangur@islandia.is](mailto:midvangur@islandia.is)). Reference Page  
[http://www.islandia.is/~midvangur/new\\_page\\_8.htm](http://www.islandia.is/~midvangur/new_page_8.htm)

Jean-Pierre Féral - <http://www.obs-banyuls.fr/web/departments/feral/biolpop/Accueil1.htm>  
UMR 7628 - MODELES EN BIOLOGIE CELLULAIRE ET EVOLUTIVE  
Biologie de Populations et Évolution des Invertébrés Marins.

Maria Dolores Gil Cid - <http://www.ucm.es/info/paleo/personal/gilcid.htm>  
Professor, Department of Paleontology, Ciudad University, Madrid, Spain  
ViceDirector del Instituto de Geología Económica (CSIC-UCM).

Ben Greenstein - <http://www.cornell-iowa.edu/~bgreenstein>

Philippe Grosjean - Marine Biology Laboratory, ULB, Belgium, Mariculture and Biostatistic,  
SciViews Project Coordinator - <http://www.sciviews.org>

Monique Guillou -

My main echinoderm model in ecology and ecotoxicology is *Sphaerechinus granularis*. Please find in this web page some informations to better know this sea urchin.  
<http://www.univ-brest.fr/IUEM/BIOFLUX/PNDR/echino.html>

In *Sphaerechinus granularis* resource allocation is "plastic" and varies in response to environmental changes. The following page presents changes in the reproductive strategy of this species according to food availability.  
<http://www.univ-brest.fr/IUEM/BIOFLUX/PNDR/allocener.html>

Jean-François Hamel - [www.seve.cjb.net](http://www.seve.cjb.net)

Reimund Haude - <http://www.gwdg.de/~uggpwww/>

Joan Herrera - <http://nersp.nerdc.ufl.edu/~herrera/>

Liam Herringshaw - This is a fairly simple personal profile of me within the School of Earth Sciences' website. It includes a particularly scary photograph.  
[http://www.bham.ac.uk/EarthSciences/people/research/herringshaw\\_1.html](http://www.bham.ac.uk/EarthSciences/people/research/herringshaw_1.html)

Alan Hodgson - <http://www.rhodes.ac.za/conferences/icird2001>

**9th International Congress on Invertebrate Reproduction and Development. July 2001.** First announcement and preliminary details

Anne Hoggett and Lyle Vail - <http://www.austmus.gov.au/science/projects/lizard/index.htm>  
Directors, Lizard Island Research Station

Susan Hottenrott - <http://home.att.net/~ophiuroid>

"The Ophiuroidea- bringing you the very latest in ophiuroid technology, news and gossip" This is an entertaining and informative site for both for the general public seeking ophiuroid basics as well as colleagues and graduate students seeking information on museum collections, funding and systematics resources.

Craig Johnson - Tasmanian Aquaculture and Fisheries Institute [TAFI]  
TAFI web site: [http://www.utas.edu.au/docs/tafi/TAFI\\_Homepage.html](http://www.utas.edu.au/docs/tafi/TAFI_Homepage.html)  
University of Tasmania, Dept of Zoology-  
Zoology web site: <http://www.utas.edu.au/docs/zoology/homepage.html>

Thomas Kammer - <http://www.geo.wvu.edu/~kammer/welcome.htm>

Alexander Kerr - [http://peaplant.biology.yale.edu:8001/~jklab/alex\\_kerr.html](http://peaplant.biology.yale.edu:8001/~jklab/alex_kerr.html)

Philip Lambert - <http://rbcm1.rbcm.gov.bc.ca> Royal British Columbia Museum web site.  
Includes information on all aspects of the museum.



John Lucas - URL Aquaculture: <http://www.jcu.edu.au/dept/Aquaculture/aquacult.htm>

Chris Mah - <http://www.geology.uiuc.edu/~fossils/> This page currently describes the research program in our lab. (Currently out of date but should be more up to date very soon!)

Richard Martin - <http://www.marine.csiro.au/CRIMP/>  
Home page for the CSIRO Centre for Research on Introduced Marine Pests

J. Douglas McKenzie - [www.integrin.co.uk](http://www.integrin.co.uk)  
(Integrin Advanced Biosystems Ltd, Marine Resource Centre, Oban, Scotland) deals mostly with marine invertebrates.

Rich Mooi - CAS Echinoderm Web Page  
[www.calacademy.org/research/izg/echinoderm/](http://www.calacademy.org/research/izg/echinoderm/)

Tamara McGovern - details research and study system  
<http://bio.fsu.edu/~mcgovern/>

Charles Messing's comatulid crinoid page: morphology, taxonomy, ecology & feeding)  
<http://www.nova.edu/ocean/messing/crinoids/w1title.html>

Philip Mladenov - <http://gandalf.otago.ac.nz:800/Marine/marine.htm>

Andrew Morgan - <http://www.auckland.ac.nz/leigh>  
Leigh Marine Laboratory web page:

James Nebelsick - <http://homepages.uni-tuebingen.de/nebelsick/>  
Great animation of a "Clypeaster going down the taphonomic road to destruction"

John Pearse - <http://www.biology.ucsc.edu/faculty/pearse.html>

Vaclav Petr - A complete and updated bibliography of Rudolph J. Prokop  
<http://www.natur.cuni.cz/~vpetr/Rudolph.htm>  
English home page - <http://www.natur.cuni.cz/~vpetr/Anglicky.htm>  
Petr bibliography - <http://www.natur.cuni.cz/~vpetr/Petr.htm>  
Anniversary article for F.H.C. Hotchkiss - <http://www.natur.cuni.cz/~vpetr/Birth.htm>

Dieter Piepenburg - <http://www.uni-kiel.de/ipoe>

Mike Reich - <http://www.uni-greifswald.de>  
"The Fossil Holothuroidea Webpage"  
<http://www.uni-greifswald.de/~geo/REICH/P224.htm>

Mike Reich, (University of Greifswald, Germany)  
has prepared a bibliography of fossil holothurians (after 1990) -- please check:  
<http://www.uni-greifswald.de/~geo/REICH/P310.htm>  
[the complete bibliography of fossil holothurians (1828-1999) will be published next year].

Michael S. Roy - <http://www.otago.ac.nz/Zoology/staff/mr.html>

Robert Singletary - <http://www.bridgeport.edu/~robert>

Mattias Skold - <http://www.otago.ac.nz/MarineScience>

Norman Sloan - [www.harbour.com/parkscan/gwaii](http://www.harbour.com/parkscan/gwaii)  
Marine Ecologist, Gwaii Haanas National Park Reserve sea cucumber fisheries.

L. Courtney Smith - [www.gwu.edu/~clade/faculty/smith.html](http://www.gwu.edu/~clade/faculty/smith.html)

Renate Sponer - molecular evolution of ophiuroids: phylogeny, phylogeography, population genetics in *Amphipholis squamata*, *Ophiactis savignyi*, *Ophiocoma scolopendrina*.  
<http://www.dnapop.zi.ku.dk>

Kathryn Stevenson - <http://www.gla.ac.uk/Acad/Marine/library.htm>  
University Marine Biological Station, Millport, Isle of Cumbrae, Scotland

Sabine Stoehr - <http://www.nrm.se/ev/staff/stohr.html.en>

Jarek Stolarski - [www.paleo.pan.pl](http://www.paleo.pan.pl)  
Institute of Paleobiology, Polish Academy of Sciences

Claudio Tiago and Valeria Hadel - <http://www.usp.br/cbm/>  
Homepage Centro de Biologia Marinha at Universidade de São Paulo, Brasil

Research page - <http://www.usp.br/cbm/pesquisa.html>

BIOTA/FAPESP - The Virtual Institute of Biodiversity - <http://www.biotasp.org.br>  
This is a biodiversity conservation and sustainable use research program for the State of São Paulo, Brazil, sponsored by FAPESP.

Tommasi, L.R. 1999. Echinodermata recentes e fósseis do Brasil. In: BDT - Informação científica -Diversidade de espécies - Fauna - Invertebrados. Campinas: Banco de Dados 90Tropical. [in Portuguese]. <http://www.bdt.org.br/zoologia/echinodermata/>

Curriculum involving echinoderms, especially the Brazilian REVIZEE material (NE and SE Brazilian regions); also, antarctic collections; palaeobiogeography and modern biogeography of echinoderms in the South Atlantic region.  
[www.geocities.com/CollegePark/center/2122](http://www.geocities.com/CollegePark/center/2122)

Jacob van der Land - <http://www2.eti.uva.nl/database/urmo/default.html>  
editor of Unesco-IOC Register of Marine Organisms (URMO)

Steve Veatch - [http://geoscience.htmlplanet.com/Sea\\_urchin.htm](http://geoscience.htmlplanet.com/Sea_urchin.htm)  
short paper on fossil sea urchins near Garden of the Gods, Colorado.

☆☆☆☆ THESES AND DISSERTATIONS ☆☆☆☆

☆☆ AUSTRIA ☆☆

**M.Sc. Thesis**

Frank, J. 1998. The axial organ of echinoids and ophiuroids: functional microanatomy, appearance and distribution of podocytes. 85 pp. 46 figs. (In German). English abstract and caption to figures, REM/TEM. University of Salzburg.

Andreas Kroh. Lower Miocene echinoids from Gebel Gharra, Egypt (Systematics and Palaeoecology). University of Vienna, June 2000.

☆☆ BELGIUM ☆☆

**M.Sc. Thesis**

Yannick Dewael. Comparative study of calcium involvement in the luminescence control of three ophiuroid species (Echinodermata). Catholic University of Louvain. January 2000.

Raphael Morgan. Impact of the larval trophic environment of *Paracentrotus lividus* on its postmetamorphic development. Université Libre de Bruxelles. September 1998.

☆☆ BRAZIL ☆☆

**M.Sc. Thesis**

Bernardo J. de A. Mascarenhas. 1995. Temporal variation in the seastar *Asterina stellifera* (Echinodermata: Asteroidea) in Guanabara Bay, Rio de Janeiro. Universidade Federal do Rio de Janeiro UFRJ, Brazil.

Ricardo Varotto. (In progress). Growth, mortality and longevity of *Cassidulus mitis* Krau, 1954 (Echinodermata: Echinoidea). Museu Nacional, Universidade Federal do Rio de Janeiro (to be completed March 2001).

**Ph.D. Dissertation**

Ana Maria Landeira Fernandez. Energy Interconversion Catalysed by the Sarcoplasmic Reticulum Ca<sup>2+</sup>-ATPase from Sea Cucumber Smooth Muscle (*Ludwigothurea grisea*): Regulation by KCl and Sulphated Polysaccharides. 8/12/1999- PhD- Federal University of Rio de Janeiro.

☆☆ CANADA ☆☆

**Ph.D. Dissertation**

Jason Addison. (In progress). Population genetics of *Strongylocentrotus drobachiensis*. Dalhousie University, Halifax, Nova Scotia.

Fiona Harper. (In progress). Population genetics and hybridization of *Asterias rubens* and *A. forbesi*. Dalhousie University, Halifax, Nova Scotia.

**M.Sc. Thesis**

Fiona Harper. 1999. Uptake, retention and elimination of dinoflagellate cysts (*Alexandrium* spp.) by the blue mussel *Mytilus edulis*. Dalhousie University, Halifax, Nova Scotia.

☆☆ ENGLAND ☆☆

**Ph.D. Dissertation**

Liam Herringshaw. 1999. (In progress). Palaeobiology of Silurian Problematica. University of Birmingham.

Francisco A. Solis-Marin. (In progress). Ecology and molecular taxonomy of echinoderms in the North Atlantic Ocean. School of Ocean and Earth Science, Southampton Oceanography Centre. (To be completed October 2002).

☆☆ FRANCE ☆☆

**Ph.D. Dissertation**

M. Guettaf. 1997. Contribution à l'étude de la variabilité du cycle reproductif (indice gonadique et histologie des gonades) chez *Paracentrotus lividus* (Echinodermata: Echinoidea) en Méditerranée sud-occidentale (Algérie). Doct. océanol., Université d'Aix Marseille II: 1-132 + i-xii.

S. Ruitton. 1999. Les communautés benthiques et nectobenthiques associées aux aménagements littoraux en Méditerranée nord-occidentale. Structure et fonctionnement. Doct. océanol., Université d'Aix Marseille II: 1-263. (Several chapters deal with sea urchins).

Bertrand Lefebvre. 18.01.1999. Stylophora (Cornuta, Mitrata): situation au sein du phylum des échinodermes et phylogénèse. 630 p. University Claude Bernard - Lyon I (France).

**Stylophora (Cornuta, Mitrata): situation au sein du phylum des échinodermes et phylogénèse**  
Contributed by Bertrand Lefebvre

**ABSTRACT**

Stylophorans (cornutes, mitrates) constitute a group of Palaeozoic fossils whose phylogenetic position within or outside the phylum Echinodermata is still disputed. They are usually placed within "carpoids" or "homalozoans" along with solutes, cinctans and ctenocystoids. The unusual morphologies of these fossils can be interpreted in the light of a new model of skeletal homologies in echinoderms (EAT) described by Mooi et al. (1994). Solute are probably derived from primitive eocrinoids and represent blastozoans with a single, erect axial arm (homologous to a brachiote). Cinctans and ctenocystoids are blastozoans characterized by the possession of two axial arms recumbent over the theca. The stylophoran aulacophore is a composite structure, consisting of a "true" arm comparable to a crinoid arm (distal and median parts) and of an expansion of the theca (proximal region). Consequently, (1) stylophorans are more closely related to crinoids than to blastozoans and, (2) homalozoans are polyphyletic. A significant systematic revision of the class Stylophora is proposed on the basis of a sound system of plate homologies. *Ceratocystis* is a primitive stylophoran belonging to the stem-group of Cornuta plus Mitrata. These two orders are monophyletic. Cornutes derive from a Protocystites-like ancestor, and mitrates from a Lobocarpus-like primitive stylophoran. Lagynocystida are digital-bearing mitrates, Peltocystida are glossal-bearing mitrates, and in the Mitrocystitida both digital and glossal are present and incorporated into the marginal frame (primitive forms) or, as posterior spines (Anomalocystitidae). Fourteen species of stylophorans are described, including nine kirkocystids and a new species from the Llandeilo (Middle Ordovician) of Brittany: *Diamphidiocystis regnaulti*. Cover plates could open in life in all stylophorans. This opening was controlled by the degree of flexion of the arm. Different life modes have been proposed for stylophorans from the examination of the distribution of the ornamentation on the theca and on the arm. Respiration probably involved the water-vascular system, direct gaseous exchange through the thecal walls and through modified sutural pores ("accessory orifices" of cornutes). Associated faunas (trilobites) and sedimentology suggest that stylophorans favored rather deep environments of middle to distal parts of the platform. Four distinct stylophoran assemblages corresponding to different palaeobathymetries have been identified in the Ordovician on the northern margin of the Gondwana. These assemblages are dominated by cornutes at first (Tremadoc-Lower Arenig), but then the faunal component contributed by that group severely diminishes (Upper Arenig-Llandeilo). Cornutes finally become extinct (Ashgill), possibly through competition from mitrates.

**KEYWORDS - STYLOPHORANS, CORNUTES, MITRATES, ECHINODERMS, PALAEOZOIC, HOMOLOGY, SYSTEMATICS, PALAEOENVIRONMENT.**



☆☆ IRELAND ☆☆

**B.Sc.Thesis**

Verling, E. 1999. An analysis of the covering behaviour of *Paracentrotus lividus* at Lough Hyne, Ireland. University College Cork.

☆☆ JAPAN ☆☆

**Ph.D. Dissertation**

Yoshiaki Ishida. Taxonomic, Paleoecologic and Taphonomic Studies of Cenozoic Ophiuroids in Japan, especially *Ophiura sarsii sarsii* Lutken, 1855. Niigata University, March 2000.

**Dsc Dissertation (comparable to PhD)**

Motonori Hoshi. Structure of ARIS saccharide chain that triggers the acrosome reaction in starfish. Tokyo Institute of Technology, 1997.

Motonori Hoshi. Gangliosides in the intracellular membranes of sea urchin eggs. Tokyo Institute of Technology, 1997.

**Msc Thesis**

Motonori Hoshi. Study on saccharide chains of acrosome reaction-inducing substance. Tokyo Institute of Technology, 2000.

☆☆ NEW ZEALAND ☆☆

**M.Sc. Thesis**

Niki Alcock. 1999. Reproduction and aspects of ecology of *Ocnus brevidentis* in southern New Zealand. Otago University, New Zealand.

**M. Sc.(Geology)**

Mike Eagle. Triassic Crinoidea in Accreted Terranes of New Zealand and New Caledonia. April 31st 2000; University of Auckland.

☆☆ RUSSIA ☆☆

**Ph.D. Dissertation**

T.T. Ginanova. Morphology and cellular mechanisms of muscle regeneration in holothurians. Vladivostok, Institute of Marine Biology, June 7, 2000.

Igor A. Gorchakov. Biology of the seastar *Asterias rubens* L. From White and Barents seas in different salinity environments. Petrosavodsk University, Biological Faculty, Petrosavodsk, Russia. (in press).

☆☆ SRI LANKA ☆☆

**B.Sc. Dissertation**

Thampoe Eswaramohan. 1999. A search for the digestive of *Holothuria scabra*. University of Jaffna. (supervised by P. Krishnarajah).

☆☆ THAILAND ☆☆

**M. Sc. Thesis**

Nisit Ruengsawang. 2000. Bioerosion by a sea urchin, *Diadema setosum*, in coral communities at Khang Khao Island, inner Gulf of Thailand. Ramkhamhaeng University, Thailand.

☆☆ UNITED STATES ☆☆

**Ph.D. Dissertation**

Adams, N. 2000. Biochemical and behavioral defenses against ultraviolet radiation in the green sea urchin *Strongylocentrotus droebachiensis*. University of Maine.

Hill, S. 2000. Effects of abiotic and biotic stress on the energy budgets of *Arbacia punctulata* and *Lytechinus variegatus* (Echinodermata: Echinoidea). University of South Florida.

Kerr, A.M. 2000. Evolution and Systematics of Holothuroidea (Echinodermata). Yale University.

Sanford, E. 1999. Oceanographic Influences on Rocky Intertidal Communities: Coastal Upwelling, Invertebrate Growth Rates, and Keystone Predation. Oregon State University, September 1999.

**M.Sc. Thesis**

Farley, G.S. 1999. Sperm-egg collisions and fertilization in the sea urchin *Lytechinus variegatus*. Florida State University, Tallahassee.

Flowers, J. 1999. Discordant patterns of genetic and morphological variation and their implications for the taxonomy of *Leptasterias* subgenus *Hexasterias* of the North Pacific. Louisiana State University.

Harrington, Laura M. 1999. Annual Changes in the Nutritive Phagocytes of the Green Sea Urchin, *Strongylocentrotus droebachiensis*: Relevance to Gametogenesis and Aquaculture. University of New Hampshire.

Plank, L.R. 2000. The effect of dietary carotenoids on carotenoid profiles and gonad growth, development and color in *Lytechinus variegatus* (Lamarck) (Echinodermata: Echinoidea). University of South Florida.

☆☆☆☆☆ ANNOUNCEMENTS ☆☆☆☆☆

**ECHINODERM-L**  
**(Echinoderm Mailing List)**

**Communicated by Sabine Stoehr**

Dear colleagues!

I am certainly not the only one nor the first to feel that it would be great to be able to somehow reach many echinoderm workers at the same time. After talking to a number of people I have decided to do something about it and I have now opened a mailing list for echinoderm scientists. The list is open to anyone conducting research on echinoderms, living and fossil. It is intended as an easy way to communicate information of any kind, e.g. announcements about meetings, and of course for the discussion of any scientific subject with relevance to echinoderms. For this to work, many people have to join the list. Therefore, I want to invite all of you to subscribe to the echinoderm mailing list **ECHINODERM-L**, hosted at the Swedish Museum of Natural History. You do so by sending an email to [listserv@nrm.se](mailto:listserv@nrm.se)

with the first line in the body of the message containing the command

**SUBSCRIBE ECHINODERM-L Yourfirstname Yourlastname**

do not include any other text and leave the subject line empty. Your subscription will be acknowledged by a text providing detailed information about the list and its operation. If you experience any problems with joining the list, you may contact me directly at [sabine.stoehr@nrm.se](mailto:sabine.stoehr@nrm.se). After you have subscribed to the list you can send messages to all participants at [echinoderm-l@nrm.se](mailto:echinoderm-l@nrm.se).

I will make every effort to keep this list free from unwanted messages (spam) and hope that this will not prove an unmanageable task.

With best regards

Sabine Stoehr, PhD, Curator of echinoderms  
Swedish Museum of Natural History  
Box 50007  
SE-104 05 Stockholm, Sweden  
email: [sabine.stoehr@nrm.se](mailto:sabine.stoehr@nrm.se)







**J. Douglas McKenzie** - I've left the Scottish Association for Marine Science (SAMS) and am now running Scotland's first marine biotechnology company (**Integrin Advanced Biosystems Ltd**). We deal mostly with marine invertebrates and will hopefully be continuing with some aspects of my echinoderm research, particularly cell cultures, surface coats and bacterial symbionts.



## **Phylum Echinodermata is now on the Tree of Life**

### **Announcement and call for participants**

**Communicated by Greg Wray**

The Tree of Life project, organized by David Maddison of the University of Arizona, is a great resource for teaching and research -- and a lot of fun to just browse. In brief, the aim of the project is to represent the hierarchical organization of life via world wide web pages that contain illustrations, group characteristics, and phylogenetic information. I've been asked to serve as the coordinator for our favorite phylum, and the base page for the phylum is now on line. A very nice page for Class Crinoidea (done by William Ausich and Charles Messing) has been up for some time. I like to invite you to visit these pages to get a feel for the Tree of Life project (the links are listed below). Please give the authors of their pages feedback about errors, omissions, arresting photos, and ideas for future features. While you're looking around, consider joining in the effort to flesh out some of the other major groups of echinoderms. Colin Sumrall and James Sprinkle have been working on some of the Paleozoic "oddball" groups, and Emily Knott is tackling the Class Asteroidea. If you would like to become involved in authoring a taxon (class, order, family, genus, or species), please let me know. Some groups are already spoken for, but many, many very interesting taxa need to be represented. No programming experience is necessary. If you're interested or just have questions, please email me at: **gwwray@duke.edu**

The Tree of Life home page: **<http://ag.arizona.edu/ENTO/tree/phylogeny.html>**

Echinodermata: **<http://phylogeny.arizona.edu/tree/eukaryotes/animals/echinodermata/echinodermata.html>**

Crinoidea: **<http://phylogeny.arizona.edu/tree/eukaryotes/animals/echinodermata/crinoidea/crinoidea.html>**





## **A new mailing list on BIODIVERSITY is born**

**Communicated by Sam Dupont**

This list is linked to the Research Center of Biodiversity of the University of Louvain in Belgium.

For further information: <http://www.biol.ucl.ac.be/fyga/bdiv/>  
or you can contact me at [dupont@bani.ucl.ac.be](mailto:dupont@bani.ucl.ac.be)



## **ANNOUNCEMENT**

### **Post Doctoral Position**

I have recently been informed by the National Science Foundation that my grant, which includes funding for a post doctoral researcher and two graduate students, has been funded for three years starting later this summer. I am interested in filling the post doc as soon as possible, but I am also always looking for committed graduate students. All positions involve molecular and cellular investigations of the immune system of the purple sea urchin. My lab is located in the Biology Department at the George Washington University in Washington DC, USA. For those of you who are interested, more detailed information regarding our research can be obtained from my web page (address listed below). Furthermore, I welcome emails and phone calls.

Courtney Smith

L. Courtney Smith, Ph.D.  
Assistant Professor of Biology and of Genetics  
334 Lisner Hall  
Department of Biological Sciences  
George Washington University  
2023 G St NW  
Washington DC 20052  
phone: 202-994-9211 (office)  
[csmith@GWIS2.CIRC.GWU.EDU](mailto:csmith@GWIS2.CIRC.GWU.EDU)  
web page: <http://www.gwu.edu/~clade/faculty/smith>





## BOOK MAILING ANNOUNCEMENT

Communicated by Peter Jell

A large volume (43, part 1) of the Queensland Museum Memoirs was published in July 1999 and despatched to all known Palaeozoic echinoderm workers in August 1999. It was part of a mailout from the Museum library through a private sector mail contractor. There was a major problem with this mail reaching all overseas destinations because the ship it was on was held up in Columbo. The parcels were eventually despatched by surface mail from Columbo on 16 December 1999 and most have reached their intended recipients by about May/June 2000. However, if we have missed anyone or if any Palaeozoic echinoderm workers have not received copies please contact me and I shall post a copy immediately. The volume contains papers on Silurian/Devonian crinoids from Victoria, crinoids, asterozoa and blastoids from the Bokkeveld Series of South Africa, Upper Devonian crinoids and a blastoid from Western Australia, an Upper Cambrian carpod from western Queensland, Australia-wide papers on Carboniferous and Permian crinoids with Gary Webster, and latest Ordovician to Devonian carpodids from Victoria with Marcello Ruta. If you have been on Gary Webster's or my echinoderm reprint exchange list and have not received the volume please let me know - it certainly was mailed and we would not be surprised if you have not received it. [peter.jell@qm.qld.gov.au](mailto:peter.jell@qm.qld.gov.au)



## SEA URCHIN ( *Tripneustes gratilla* ) RESEARCH PROJECT

Marie Antonette Juinio-Meñez, Ph.D.  
Marine Science Insitute University of the Philippines  
Diliman, Quezon City , Philippines 1101

From 1988 to 1992, the reef flats of Bolinao, Pangasinan, Philippines supported a thriving sea urchin (*Tripneustes gratilla*) fishery that generated multimillion peso earnings per annum and employed thousands of coastal fisher families. However, uncontrolled and nonselective harvesting of spawning stocks led to the inevitable collapse of the fishery in 1992 (Juinio-Meñez et al., 1998). Despite a moratorium on commercial harvesting since 1992, no significant natural recruitment has been observed in the past few years.

The sea urchin culture research was initiated at the Bolinao Marine Laboratory of the University of the Philippines Marine Science Institute in 1993 with the aim of enhancing the recovery of *T. gratilla* spawning populations in Bolinao through reseeding efforts and cage grow-out of cultured sea urchins. Grow-out culture in sea cages/pens was deemed to be a very promising mechanism for the sustainable management of sea urchin resources. Artificial aggregations of sea urchins in grow-out cages may increase fertilization success during spawning and enhance local larval recruitment. In addition, sea urchin grow-out culture can provide a supplemental source of livelihood for fisher-cooperators (reviewed in Juinio-Meñez et al., 1998). To date, the project has successfully closed the entire life cycle of *T. gratilla* in the laboratory, and maintains the only echinoderm hatchery in the

country. The hatchery produces approximately 40,000 sea urchin seedstock (> 1 cm TD) per annum. The seedstock is used in pilot grow-out studies and made available to interested cooperators as well as for reseeded in marine protected areas. Sea urchins attain sexual maturity at an average size of 6.0 cm TD, about 8-9 months after settlement. Experimental grow-out culture and reseeded of cultured sea urchins in Bolinao were conducted since 1996. At any one time there are 6,000-10,000 adult sea urchins in the grow-out cages on the reef flat.. The sea urchins are harvested only when they attain a test diameter of 7.0 cm. In addition about 40,000 sea urchins were reseeded in selected reef areas in Bolinao. The impact of these enhancement activities is difficult to ascertain. However, for the first time in 1999, significant natural sea urchin recruits were observed at various reef areas in Bolinao. No recruits have been found in adjacent reefs including the Hundred Island National Park. During the same survey period in 1999. Recruits were particularly notable at the community managed marine reserve in Balingasay which was reseeded with over 2,000 cultured sea urchins in 1997. Strict implementation of the recently approved municipal fishery ordinance which prohibits the collection of sea urchins on a commercial scale will be essential to ensure recovery of natural sea urchin populations in the immediate future.

The results of a preliminary larval dispersal model have suggested that sea urchin spawning populations in Bolinao may not be self-seeding, and that *T. gratilla* populations along the northwestern coast of Luzon may interconnected through reciprocal larval exchange (Juinio-Meñez and Villanoy, 1994). In order to test this hypothesis, the project is also undertaking a population genetics study to determine the degree of genetic contiguity of *T. gratilla* populations along the Western coast of Luzon. Analyses of the genetic structure of the different populations will be very important in determining the appropriate scale of management of this valuable fishery resource as well as in monitoring the impact of reseeded and grow-out of cultured sea urchins on the genetic structure of natural populations.

Current research funded by the Department of Agriculture - Bureau of Agricultural Research is geared towards the development of appropriate grow-out culture protocols and the promotion of grow-out technology to fishers in the community and selected localities along Western Luzon, using either cultured or wild seedstock. The project also conducts periodic workshops/trainings on sea urchin grow-out culture and management for fishery managers, extension workers, students, and interested fisherfolk.

References cited:

Juinio-Meñez, M.A., N.D. Macawaris, & H.G. Bangi. 1998. Community-based sea urchin (*Tripneustes gratilla*) grow-out culture as a resource management tool. *In*: G.S. Jamieson and A. Campbell (Editors), North Pacific Symposium on Invertebrate Stock Assessment and Management. Can. Spec. Publ. Fish. Aquat. Sci. 125: 393-399.

Juinio-Meñez, M.A. and C. Villanoy. 1994. Sea urchin recruitment studies for management considerations. Proc. 4<sup>th</sup> LIPI-JSPS Joint Seminar on Marine Science, Jakarta, 15-18 November 1994: 15-20.

For more information contact:

**Marie Antonette Juinio-Meñez, Ph.D.**  
**Project Leader**  
**e-mail: menez@msi01.cs.upd.edu.ph**



☆☆☆☆☆☆ CONFERENCE ANNOUNCEMENTS ☆☆☆☆☆☆

**4TH NORTH AMERICAN ECHINODERM CONFERENCE**

**Communicated by Emma Creaser**

Dear Echinoderm Biologist,

The 4th North American Echinoderm Conference (NAEC) will be held August 22-26, 2001 at the University of Maine\*s Darling Marine Center (<http://server.dmc.maine.edu>) in Walpole, Maine. This four-day conference will be a great opportunity for echinoderm biologists from a broad array of fields to exchange their recent research findings in a stunning location. The event will feature keynote addresses by Drs. John Pearse, Paul Tyler and Craig Young as well as sessions of oral and poster presentations.

Check-in begins Wednesday afternoon with an opening reception that evening. A tentative schedule of events includes oral presentations Thursday morning through Saturday afternoon, and a poster session on Friday afternoon just before a traditional Maine Lobster Bake. There will be an evening cruise on Saturday to close the conference.

We hope you accept this invitation to attend. In the coming weeks, additional information will be posted on the Darling Marine Center\*s website. Enclosed you will find a history of these conferences written for us by Dr. John Lawrence, and some details about the Darling Marine Center and the surrounding region. Lastly we are attaching a pre-registration form. If you are planning to attend the conference, we would greatly appreciate your returning this form before September 15 so that we may better plan and coordinate the event and facilities.

We look forwards to hearing from you!

The Organizing Committee.

**NEAC History and Commentary by Dr. John Lawrence**

Echinoderm researchers from around the world gathered at the Smithsonian Institution in Washington D.C. in 1972 for the first International Echinoderm Conference. Participants at this meeting recommended that the international meeting be held every three years and that regional meetings be held in the intervening years.

Though meetings have been held regularly in Europe since 1979, it was not until 1989 that the first North American Meeting was held as the Friends of Echinoderms at the Dauphin Island Sea Lab on the Alabama gulf coast. It was organized by James McClintock, Stephen Watts and Tom Hopkins. I remember very well talking with Tom Ebert and Malcolm Telford on the beach. Steve Stancyk and his crew of brittlestar people were there.

The second Friends of Echinoderms meeting was in 1992 at the Harbor Branch

Oceanographic Institution, It was organized by Craig Young, Sid Bosch and myself. I brought a number of tins of canned sea urchin roe from Chile. There weren't many takers. Sid was disgusted I hadn't brought Chilean wine instead. Dan Blake commented to Fred Hotchkiss and me that he didn't recognize fifty percent of the persons there. I told him that was because fifty percent were younger than fifty.

As some university administrators did not think a "Friends" meeting could have academic and scientific respectability, the title of the third meeting was changed to the North American Echinoderms Meeting. It was held in 1998 at the Wallops Island Marine Science Center in Virginia and organized by Thomas Klinger. I was particularly impressed with the participation of many graduate students such as Emily Knott, Anne Boettger, Kristina Wasson, Christopher Mah, Ana Christensen, Nature McGinn and Sophie Hill. At the other end of the generation span, Robert Hill talked about degenerating cucumber walls and John Ferguson discussed fluid balance. Rebecca Ferguson, John's wife, talked with Bob and found she had been a student at the University of Maine when he was an instructor there.

Over the years, these meetings have served a useful purpose by allowing echinoderm biologists of a wide array of disciplines to come together in an informal way to become acquainted with each other and each other's work. The interaction between graduate students and established investigators has been particularly valuable. The 2001 NAEC Conference will certainly continue this tradition.

I hope to see you there!

- John Lawrence

The Darling Marine Center and Maine\*s Mid-coast

The Darling Marine Center is the marine lab for the University of Maine. It located in the small village of Walpole, not far from Damariscotta, in heart of mid- coast Maine. The DMC is 60 miles north of Portland and just 3 hours from Boston by car. Maine's mid-coast area offers plenty to see and do including stunning vistas of rocky headlands and lighthouses, and beautiful beaches. Local communities are supported by a thriving lobster fishery, an oyster aquaculture industry, and of course, tourism.

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## **4th North American Echinoderm Conference Pre-Registration Form**

Name:

Address:

E-mail address:

Please return to E. Creaser by email to [ecreaser@unity.unity.edu](mailto:ecreaser@unity.unity.edu) or by fax to (207) 948-6277

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**The next (6th) European Conference on Echinoderms will be held  
in Banyuls-sur-mer - FRANCE  
Provisional date: 1st week of September 2001**

**Organiser: Jean-Pierre Féral**  
UMR CNRS 7628  
Observatoire Océanologique, BP 44  
Banyuls-sur-mer 66651 FRANCE

Phone: +33 4 6888 7318  
Fax: +33 4 6888 7383  
**feral@obs-banyuls.fr**



**Advanced Workshop in Honour of Eizo Nakano:  
Sea Urchin Aquaculture**

**Communicated by Yukio Yokota**

IMC - International Marine Centre November, 2000

Scope: The aim of the workshop is to introduce the modern concept of resource management of sea urchin stock and to transfer advanced techniques and know-how in the sea urchin aquaculture. For this purpose, specialists in the field of sea urchin biology/aquaculture are invited from Europe, USA and Japan as lecturers. The workshop offers participants both theoretical and practical lessons. Fifteen lectures are invited for the understanding of the biological background and resource management of sea urchin stock. The practical course will be held with a number of teaching assistants for the acquisition of advanced techniques in sea urchin aquaculture. This workshop is dedicated to the memory of Eizo Nakano who died in October 1999. He was always at the cutting edge of the field of sea urchins biology and organised many international workshops as a founder of the IMC. If you wish to receive more information, please return the pre-registration form below by e-mail/fax/post. Further information can be found on our webpage. URL: <http://www.imc-it.org/seaurchin>

## Topics

1. Biological aspects of the sea urchin.
2. Effects of environmental changes on natural sea urchin stock.
3. Technical aspects of sea urchin aquaculture.
4. Impact of sea urchin aquaculture on the environment.
5. Sustainable sea urchin resource management.

Venue IMC - International Marine Centre, Torregrande, Sardinia, Italy

Date 20 November - 1 December, 2000

Course fee 500 euro (A limited number of fellowships will be available)

Registration dead line September 2000

Number of Participants : 20 - 25 participants are expected.

Sponsored by (Planned) European Commission (EU), Consiglio Nazionale delle Ricerche (CNR), Regione Autonoma della Sardegna, Alitalia, Carl Zeiss, etc.

Secretariat: Donatella Marchi - IMC,  
Monica Pinna and Marta Zanini - CNR  
IMC - Loc. Sa Mardini, Torregrande, Oristano, Sardinia, Italy  
Tel: +39-0783-22027 / 22032 / 22136 Fax: +39-0783-22002  
e-mail: [hirano@barolo.icb.ge.cnr.it](mailto:hirano@barolo.icb.ge.cnr.it)  
Web page address: <http://www.imc-it.org/seaurchin>

## Organising Committee

Dr. Silvana Vallerga, HS, ICB-CNR and IMC, Italy  
Dr. Yukio Yokota, LC, Aichi Prefectural University, Japan  
Dr. Giovanni Giudice, LC Università di Palermo, Italy  
Dr. Valeria Matranga, LC IBS-CNR, Italy  
Dr. Joe Hirano, HS, LC IMC, Italy  
Dr. Rosalba Murgia, HS IMC, Italy  
Dr. Maura Baroli, HS IMC, Italy

HS, Host Staff; LC, Lecturer, ICB, Istituto di Cibernetica e Biofisica;  
CNR, Consiglio Nazionale delle Ricerche; IMC, International Marine  
Centre; IBS, Istituto di Biologia dello Sviluppo



**List of invited lecturers**

Dr. Shonan Amemiya, University of Tokyo, Japan. Developmental biology

Dr. R. Andrew Cameron, California Institute of Technology, USA. Developmental biology, Genetics

Dr. Richard, B. Emlet University of Oregon, USA. Marine biology, Ecology

Dr. Carla Falugi, Universitdi Genova, Italy. Marine biology, Developmental biology

Dr. Giovanni Giudice, Universitdi Palermo, Italy. Zoology, Developmental biology

Dr. Heinz Gundlach, Carl Zeiss, Germany. Microscopy

Dr. Joe Hirano, IMC, Italy. Marine biology, Molecular genetics

Dr. Valeria Matranga, Istituto di Biologia dello Sviluppo - CNR, Italy. Developmental biology, Stress response and environmental biology

Dr. Amir Neori, National Center for Mariculture, Israel. Aquaculture

Dr. Maria Carmela Roccheri, Universitdi Palermo, Italy. Developmental biology

Dr. Muki Shpigel, National Center for Mariculture, Israel. Aquaculture

Dr. Tatsuya Unuma, National Research Institute of Aquaculture, Japan. Aquaculture

Dr. Ikuko Yazaki, Tokyo Metropolitan University, Japan. Developmental biology

Dr. Yukio Yokota, Aichi Prefectural University, Japan. Developmental biology

To be nominated, European Commission. Aquaculture and CFP

**\*\* Titles of lectures are located in the Conferences section of newsletter**

**SEE PAGE 141**



# 5<sup>TH</sup> CONGRESS ON MARINE SCIENCES

## Marcuba '2000

### “Towards a More Integrated Management of Marine and Coastal Resources”

4-8 December, 2000

Havana International Conference Center, Cuba

#### SECOND ANNOUNCEMENT / MAY 2000

*Dear Colleague:*

*The National Oceanographic Committee (CON) is delighted to announce that the 5<sup>th</sup> Congress on Marine Sciences, MARCUBA '2000 will be held from 4 to 8 December, 2000 at Havana's International Conference Center, Cuba.*

*“Towards a More Integrated Management of Marine and Coastal Resources” will be the central motto that the Marcuba '2000 Organizing Committee proposes, with a suggested list of novel, updated topics in the field of marine sciences and an attractive scientific program for participants.*

*With the purpose of increasing the quality and scientific content of the event, we will count on the presence of outstanding national and international specialists that are distinguished for their important contributions in the field of marine research.*

*From Cuba, the largest of the Caribbean Antilles, we are pleased to extend a warm and cordial invitation to share the scientific dialogue and at the same time enjoy the kindness of our climate, our cultural expressions and the welcoming affection toward our visitors.*

*We are expecting your decision to attend Marcuba '2000 very soon and hope to have the privilege of welcoming you in Havana.*

*Sincerely,*

*Guillermo García Montero  
President  
National Oceanographic Committee*

## **ORGANIZERS**

National Oceanographic Committee  
Cuban Society of Marine Sciences  
Fishery Research Center  
Center for Marine Research  
Institute of Oceanology  
National Aquarium of Cuba  
GEOCUBA  
Center for Environmental Management and Engineering of Bays.  
Center for Information, Management and Environmental Education  
Environmental Policy Directorate

## **SPONSORS**

Cuban National Commission of UNESCO  
Intergovernmental Oceanographic Commission (of UNESCO)  
International Ocean Institute (IOI)  
Latin American and Caribbean Regional Office of  
the United Nations Environmental Programme (UNEP)

## **Communication with the organizers:**

Lic. Argelia Fernández  
Secretaria Ejecutiva  
V Congreso de Ciencias del Mar  
Calle 18-A No. 4114 e/ 41 y 47  
Playa, Ciudad de La Habana, Cuba  
Telef:(537)29-6014  
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Lic. Mireya Mesa Tamargo  
Organizador Profesional de Congresos  
Palacio de Convenciones de La Habana, Cuba  
Apartado Postal 16046  
Telf.: (537)286176, 226011/19  
Fax: (537)287996 / 283470 / 228283  
E-mail: [mireya@palco.get.cma.net](mailto:mireya@palco.get.cma.net)

## ☆☆☆☆ INFORMATION REQUESTS ☆☆☆☆

P.S. Asha requests reprints on works done on the sea cucumber *Holothuria spinifera*. Please contact at TRC of CMFRI, Tuticorin, India.

Mike Bell would like to get in touch with colleagues interested in trace fossils of asteroids and ophiuroids or the tracks made by ophiuroids walking in soft mud. [mbell@chelt.ac.uk](mailto:mbell@chelt.ac.uk)

Andrzej Boczarowski is looking for H. Theel, and H. Ludwig papers & monography about holothurians. I am looking for papers about recent and fossil Holothuroidea and Ophiuroidea. [boczar@us.edu.pl](mailto:boczar@us.edu.pl)

Carla Bundrick would like site information for *Amphiodia occidentalis* and *Amphipholis squamata*, and any reported brooding amphiuroid brittle stars at [Bookw342@aol.com](mailto:Bookw342@aol.com)

Roger Clark requests information on the families: Ganariidae taxonomy (worldwide); Solasteridae; Pterasteridae in the North Pacific. Please contact me at: [insignis@cdsnet.net](mailto:insignis@cdsnet.net)

Steve Donovan is interested in hearing of examples of (a) fossil crinoid columns preserved perpendicular to bedding - that is, in life position - and (b) examples of fossil and Recent crinoid columns that have been decapitated, presumably by predation, and which show signs of healing by overgrowth (see Donovan, S.K., and Pawson, D.L. 1998 (for 1997). Bulletin of Marine Science, 61:571-579). These have so far been recognized in extant bourgueticrinids (*Democrinus* spp.) and Upper Ordovician cincinnaticrinids (*Cincinnaticrinus* spp.). Please contact me at [sted@nhm.ac.uk](mailto:sted@nhm.ac.uk)

Samuel Dupont is looking for some new populations of the small ophiuroid *Amphipholis squamata*. Thanks. Please contact at [dupont@bani.ucl.ac.be](mailto:dupont@bani.ucl.ac.be)

Mike Eagle is interested in reprints of Recent and fossil echinoderms, particularly Crinoidea; also, spare reference material for comparative study of Recent and fossil echinoderms. [meagle@akmuseum.org.nz](mailto:meagle@akmuseum.org.nz)

Jean-Pierre Féral requests alcohol (ethanol) 80-100 preserved *Amphipholis squamata* and alcohol (ethanol) 80-100 preserved *Echinocardium cordatum*. [feral@obs-banyuls.fr](mailto:feral@obs-banyuls.fr)

Alfred Goldschmid requests information on podocytes in axial organs of echinoderms or in relation with other organ systems. Please contact at [alfred.goldschmid@sbg.ac.at](mailto:alfred.goldschmid@sbg.ac.at)

Igor Gorchakov requests reprints on echinoderms allotype analyses in metapopulations. Also, I would like to take part or find a group of people to research echinoderms in the North Atlantic region during Summer-Autumn 2000 (June-October). Please contact me at [svalan@research.karelia.ru](mailto:svalan@research.karelia.ru)

Susan Hottenrott - I am interested in contacting ophiuroid researchers to add contacts/information to my "Ophiuroidea" website. Much of the site is directed to the public, so any interesting or bizarre facts about ophiuroids (as well as serious research) is welcome! In addition, I have a section on museums around the world with echinoderm collections. If you know of a collection, please let me know where

it is, and briefly describe the echinoderm collection. Please respond to [sih@gwu.edu](mailto:sih@gwu.edu)

Padmini Krishnarajah would appreciate information and/or reprints on feeding and food habits of *Holothuria scabra* and reproductive capacity in *H. scabra*. Please contact me at [zoology@net.panlanka](mailto:zoology@net.panlanka)

Amanda Leland would like to see or be part of an effort to map echinoderm (especially echinoid) distributions and abundances globally in some relation to taxonomy. I would also like to be informed of upcoming conferences relating to benthic ecology, echinoderm biology and similar areas of interest. Please contact me at [Amanda.Leland@umit.maine.edu](mailto:Amanda.Leland@umit.maine.edu)

Chris Mah - My PhD dissertation concerns a phylogeny/systematic revision of the Goniasteridae. Any goniasterids, fossil or recent are of interest. Indo-Pacific deep-water to continental shelf faunas are of particular interest. I am interested in images from submersibles, as well as collections and specimens. I am happy to provide identifications in exchange for material. Fossil goniasterid material is also of great interest. Please contact me at [mah@uiuc.edu](mailto:mah@uiuc.edu)

Sara Marcus welcomes reprints concerning her research. She is exploring the phylogenies and ontogenetic series of the Paleozoic crinoid Superfamilies Allagecrinacea and Codiocrinacea, also commonly called microcrinoids. I am in the process of revising both of these Superfamilies. [samarcus@indiana.edu](mailto:samarcus@indiana.edu)

Kirsten Sadler would like information from anyone who has tried to cryopreserve echinoderm gametes. Please contact at [kirsten\\_sadler\\_phd98@post.harvard.edu](mailto:kirsten_sadler_phd98@post.harvard.edu)

L. Courtney Smith - I am always looking for students interested in conducting research on the molecular immunology of echinoderms, in particular, using the purple sea urchin. Please contact me at [csmith@gwu.edu](mailto:csmith@gwu.edu)

Francisco Solís-Marín would like to receive the following material for DNA analysis: *Mesothuria* (Holothuroidea), *Echinus* (Echinoidea) and *Ophiocten* (Ophiuroidea) from any part of the world. Please contact me at [fasm@soton.ac.uk](mailto:fasm@soton.ac.uk)

Thanitha Thapanand- I would like to contact some specialists in population dynamics and/or stock assessment in echinoderms. As I am fishery biologist in this field and I wish to continue my study in Ph.D. about it. My interesting topic is about how to assess the tropical echinoderm's population in Thailand--especially in holothurians and urchins. So, please give me more information or contact me at [ffistnt@ku.ac.th](mailto:ffistnt@ku.ac.th)

Hideyuki Tominaga - would be grateful to receive specimens preserved in alcohol or formalin of the 3 sexual dimorphism brittle stars, *Ophiodaphne formata*, *Ophiosphaera insignis* and *Amphilycus scripta* for the histological and SEM observation. Please contact at [kashipan@po.sphere.ne.jp](mailto:kashipan@po.sphere.ne.jp)

Alexandr Yevdokimov - I will be very thankful if I can get contacts with specialists in Echinodermata and ecologists. [dunupi@hotmail.com](mailto:dunupi@hotmail.com)

Pavel Zadorozhny - If anyone knows the email address of Tsushima M., Kyoto Pharmacological University in Japan, please contact me at [root@tinro.marine.su](mailto:root@tinro.marine.su)



## Ailsa's Section

### ☆☆☆ Echinoderms in Literature ☆☆☆

**Contributed by James Nebelsick**

Here an excerpt from the literature concerning ecology and intelligence of sea-urchins and starfish.

The Voyages of Doctor Dolittle

by Hugh Lofting

written in 1923

Part 6, chapter 5

The narrator is Tommy Stubbins, son of Jacob Stubbins, the cobbler of Puddleby-on-the-marsh. This episode concerns the difficulties in striking up a conversation with the Great Glass Sea-snail who eventually took the Doctor and his entourage from Spidermonkey Island back to England.

#### THE SHELLFISH RIDDLE SOLVED AT LAST

So Doctor Dolittle with a crown on his head sat down upon the shore like King Cnut, and waited. And for a whole hour the porpoises kept going and coming, bringing up different kinds of sea-beasts from the deep to see if they could help him.

Many and curious were the creatures they produced. It would seem, however, that there were very few things that spoke shellfish except the shellfish themselves. Still, the porpoises grew a little more hopeful when they discovered a very old sea urchin (a funny ball-like, little fellow with long whiskers all over him) who said he could not speak pure shellfish, but he used to understand starfish - enough to get along - when he was young. This was coming nearer, even if it wasn't anything to go crazy about. Leaving the urchin with us, the porpoises went out once more to hunt up a starfish.

There were not long getting one, for they were quite common in those

parts. Then, using the sea-urchin as an interpreter, they questioned the starfish. He was a rather a stupid sort of creature; but he tried his best to be helpful. And after a little patient examination we found to our delight that he could speak shellfish moderately well.

Feeling quite encouraged, the Doctor and I now go into the canoe; and, with the porpoises, the urchin and the starfish swimming alongside, we paddled very gently out till we were close under the towering shell of the Great Snail.

And then began the most curious conversation I have ever witnessed. First the starfish would ask the snail something; and whatever answer the snail gave, the starfish would tell it to the sea-urchin, the urchin would tell it to the porpoises and the porpoises would tell it to the Doctor.

In this way we obtained considerable information, mostly about the very ancient history of the Animal Kingdom; but we missed a good many of the finer points in the snail's longer speeches on account of the stupidity of the starfish and all this translating from one language to another.



**Contributed by K. Emily Knott**

From Isabel Allende's *Aphrodite*:

"For me, the penetrating odor of iodine stirs images not of wounds or surgeries, but of sea urchins, those strange creatures of the deep inevitably related to my initiation into the mystery of the senses. I was eight when the rough hand of a fisherman placed the tongue of a sea urchin in my mouth. When I visit Chile, I seek the opportunity to go to the coast and taste freshly caught sea urchins once more, and every time I am flooded by the same mixture of terror and fascination I felt during that first intimate encounter with a man. Those ocean creatures are inseparable in my mind from that fisherman, with his dark sack of shellfish streaming seawater, and my awakening sensuality."



John D. MacDonald. A deadly shade of gold. "People don't wear signs, and being dropped into a strange area is like a starfish landing on a strange oyster bed. You don't know which one to open, or if you can open anything."

## ☆☆☆ HOW I BEGAN STUDYING ECHINODERMS ☆☆☆

### PART 10

#### Elisa Maldonado - UCLA

It all began at 3 a.m. on June 21, 1997, when I met Gordon Hendler for the first time at the gates of the PG&E Nuclear Power Plant. Gordon had planned this VERY early morning venture as the prologue to the summer portion of the Museum Research Apprenticeship Program (MRAP) at the Los Angeles County Natural History Museum. I knew little about brittle stars, except for the fact that when *Ophioderma panamense* is involved in a righting-race against *Asterina miniata* and *Strongylocentrotus franciscanus*, the large brittle star is always sure to win. I learned this while volunteering summers at the Cabrillo Marine Aquarium in San Pedro, California, where I would take bets from captivated five-year-olds on which echinoderm could flip over the fastest.

When I read the brittle star project description, which included the early morning collecting trip, I was smitten by the prospect of a summer adventure. Gordon said he wanted to see what we were made of, and boy did he mean what he said! Not only did our tasks include climbing down a vertical cliff on a rickety wooden ladder with only headlamps to light our way, but we also had to use these headlamps to search among algae holdfasts for brittle stars no bigger than a pencil eraser. My fellow MRAPER, Jessica Denton, and I were quite happy with our findings...until Gordon let us know that we had found only one specimen of the elusive species that was to be our summer research project.

Plan B was put into action, and Jessica and I began the search for baby *Ophiomastix annulosa* within the reproductive pouches of adult *Ophiocoma scolopendrina*. It was so exciting to find a tiny red-spotted arm protruding from slits on a midnight black disk. I was hooked. I continued coming into the museum in my senior year of high school, spending afternoons and days off searching for baby *Ophiomastix*. Needless to say, brittle stars and marine biology had me so captivated that I have continued working in Gordon's lab to this very day.

I assume every echinoderm biologist has spent a little time studying each group before settling on their animal of choice. Sure Gordon would have loved for me to focus all of my attention on ophiuroids for the rest of my life, but I needed to get out and explore the echinoderm world! So, this past summer I headed to Washington D.C. to work with Dave Pawson as part of the Research Training Program at the National Museum of Natural History. I studied the ecology of deep-sea feather stars, a group of animals I had previously been unfamiliar with. I returned to Los Angeles in good spirits, excited by all the new things I had learned about feather stars and sea cucumbers (after a crash course on their ecology and spicule identification). I have also become excited about deep-sea research, which has shown me new avenues that I never dreamed possible!

Echinoderms blow my mind. It's so amazing how animals that appear to be so simple can have such complex lifestyles, and play just as important a role in the world's oceans as any other marine organism. No one can say that arm regeneration and starfish stomach feeding habits are not cool! I am now a third-year marine biology major at UCLA, and I plan on enrolling in a Ph.D. program in three years. Provided that nothing else catches my attention (which hasn't happened yet), I hope to continue studying the ecology of echinoderms in graduate school (and maybe for the rest of my life?? It could happen!).





**Alexandr Yevdokimov / Vladivostok, Russia**

I was born in Vladivostok, Russia November 1, 1969, graduated Vladivostok Medical University as a physician in 1995. I was interested in academic science more than to be a practitioner and spent a lot of time for the intent study of embryology at the Department of Histology and Embryology, Vladivostok Medical University. I studied early ontogenesis and objects of my studying were mainly *Strongylocentrotus intermedius* and *Strongylocentrotus nudus*. I continued my research after I graduated Medical University together with colleagues from TINRO-Pacific Research Fishery Center (Vladivostok). We made publication in 1996 (Seasonal characteristics of spermatogenesis *Strongylocentrotus intermedius*) /Evdokimov V./Yevdokimov A., Russian Research Institute of Fishing Journal, (March.1996.N1286-px96.) Couple years I was far from studying Echinodermata.

Now I am working as Japanese language interpreter (and translator) for a small Joint Venture Company (Russia-Japan). We work with *Anadara Broughtoni*, *Spisula Sachalinensis* and *Carbiculidae*. I am interested in reproduction and ecology problems. Our Japanese partners have constant interest in *Strongylocentrotus intermedius* and *Strongylocentrotus nudus*.

This year I am going to continue my education. It will probably be a post-graduate course in Biology (Echinodermata). I am interested in studying effects of visible light on ontogenesis. I am presently studying effects of visible light (520 nm and 720 nm) on reproduction and ontogenesis of *Strongylocentrotus intermedius* and *Strongylocentrotus nudus*.

I will be very thankful if I can get contacts with specialists in Echinodermata and ecologists.  
[dunupi@hotmail.com](mailto:dunupi@hotmail.com)



**Jacob Dafni / Eilat, Israel**

It was 1979, when I was looking for a subject for a PhD study. Fifteen years earlier I studied the effect of pollution on an invertebrate community species diversity, in order to assess and suggest using this method to quantify the over-all effect of pollution (without the necessity to determine the level of the individual pollutants). The most polluted site was a shallow UW slope opposite a combined power station with a desalination plant. The pollutants were thermo-haline sea water with frequent occurrence of heavy metals and organophosphates in these waters. This time I was

astonished by the sight of hundreds of sea-urchins - up to 2/3 of *Tripneustes gratilla* population - that were highly deformed - their H/D ratio reached 1.0-1.5 compared to the normal ratio - 0.55. It was obvious that these pollutants are to blame, but the mechanism was unexplained. I took the challenge and started to record the phenomenon and try to make sense out of this. Later, I found only 2 km from the first site, in an artificial estuary, to which local hotels dumped their wastewater, a second type of deformity - 3/4 of the most affected population of *T.g. elatensis* (n. ssp.) were flatter (H/D < 0.5), very often with deep concave apex, resting upon Aristotle's lantern top. Literature survey revealed that such proportions of abnormal tests in sea-urchins were never recorded elsewhere.

Preliminary observations in the deformed tests suggested that whatever the pollutant was, it twisted a highly symmetrical equilibrium that governs the morphogenesis of echinoid test, which is basically genetic, but I felt that environment -- in the form of external pressure translated through the force applied by the tubefeet and other contractile and elastic tissues - mesenterial threads, collagen fibers etc. - affects the final shape.

This study which lasted for 5 years was exhilarating for me: it demonstrated to me the marvelous symmetry of these animals' morphogenesis. Try to imagine a sea urchin with 4 ambulacra and a lantern made of 5 jaws - obviously pinched at an early stage. What is the regulative forces that are responsible to the highly tetramerous symmetry it shows. I hypothesized that it is done by a biomechanical equilibrium. I gathered much circumstantial evidence, and I also tested D'Arcy Thompson's (early 20th century) hypothesis that regular echinoids which grow on sand (with less ambulacral pull) tend to be rounder (have a higher H/D ratio) than those living on hard substrate, and lo, - I had managed to establish it. I concluded my study by publishing a "Biomechanical Model for the Morphogenesis of the Echinoid Test" with possible implications to its phylogeny, which was hailed by some, others were more sceptic. I find it encouraging that some students took the hypothesis and tested the model experimentally. My last echinoderm paper is from 1992 (a comprehensive list of my papers can be found in my web-site [www.come.to/jacob-dafni](http://www.come.to/jacob-dafni) - Come and visit).

To make a long story short, I was overwhelmed by the mechanical aspects of these animals' behavior - that use hydraulic forces to move, an unconventional coordination system to regulate the pull of the tubefeet, and moves to a desired direction - aided by light although they have no eyesight - simultaneously holding firmly in other directions. I was no less inspired by the rare specimens of echinodermologists I have met in conferences - cheerful, friendly, and cooperative.

Unfortunately, I was too old at that time to start an echinoderm career, and I have drifted to other fields. Presently, upon my retirement, I am willing to actively take part or otherwise cooperate in ongoing studies that involve Red Sea echinoderms - taxonomy, skeletogenesis, field studies etc.



## On the Preservation of Buttlestars

By Carla J. Bundrick

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No, that's not a misprint. Okay, so what is it?

Go back 56 years, to a man in New York City writing about a time and place he loved and missed. Go back 14 years before that, to 1930 when that same writer, Nobel prize-winning author John Steinbeck, first met Ed Ricketts, a marine biologist in Pacific Grove, California. The meeting was to be the beginning of a life-long friendship between the two men, and one that has been captured for over half a century in Steinbeck's writings.

Though a thinly-disguised Ed Ricketts was to appear in many of Steinbeck's works (eg. "The Snake" and *In Dubious Battle*), the character Ed is most often associated with is that of "Doc" in *Cannery Row* and *Sweet Thursday*. The successful publication of *Cannery Row* in 1945 not only affected Ed's personal life, but the book's popularity forever changed the face of Monterey. Years have come and gone, the canneries are but memories along the fog-shrouded shores of Monterey and Pacific Grove. Now the Row is filled with restaurants, clubs and gift shops; tourism has replaced the sardine packing industry with a jingle of money never dreamed of by the two good friends.

John and Ed spent several years developing their friendship, John accompanying and assisting Ed in his collecting trips and becoming very well acquainted with the marine organisms that populated the tidepools around Pacific Grove. In fact, Steinbeck's knowledge of marine biology first began in 1923 when he took classes, along with his younger sister Mary, at Stanford University's Hopkins Marine Station in Pacific Grove.

In 1940 John accompanied Ed to Baja California on a scientific expedition that resulted in publication the following year of the *Sea of Cortez*, a monumental work of science and philosophy written together by Ricketts and Steinbeck. While making preparations for the trip in 1939, Steinbeck writes in a letter to his agent Elizabeth Otis, "My dream for sometime in the future is a research scope with an oil immersion lens... Oh boy! Oh boy! Sometime I'll have one. It may interest you to know that business at the lab [Pacific Biological Laboratories] is picking up. I can't tell you what all this means to me, in happiness and energy. I was washed up and now I'm alive again, with work to be done and worth doing."

John moved to New York in November 1941. His life was busy with writing and he went to Europe to write about the War, but his memories and longings for the days on the California coast with his friends remained with him. As respite from wartime writing, Steinbeck began writing "a funny little book" which was to become *Cannery Row*. His descriptions of Monterey and Cannery Row, the land and the people, the tidepools and the wonderful life they contained poured out of John with a beauty and sympathy rarely matched in literature today. From his apartment John wrote the manuscript in neat tight handwriting on long pads of "legal" yellow paper. Chapter 5 begins:

## On the Preservation of Buttlestars

“Western Biological deals in strange and beautiful wares. It sells the lovely animals of the sea, the sponges, tunicates, anemones, the stars and buttlestars, and sun stars, the bivalves, barnacles, the worms and shells, the fabulous and multiform little brothers, the living moving flowers of the sea, nudibranchs and tectibranchs, the spiked and nobbd and needly urchins, the crabs and demi-crabs, the little dragons, the snapping shrimps, and ghost shrimps so transparent that they hardly throw a shadow.”

But when his small, precise handwritten script was typed, probably by a secretary at Viking Press, many of the marine organisms with strange names came out with “new” spellings. Tectibranchs was typed “tickle branches,” nudibranchs came out “nude branches,” and brittlestars became “buttlestars” (the small r i being seen as the letter u). Today the typescript still exists\* with John’s careful editing of the sea animals’ names, but apparently “buttlestars” was overlooked, and the original misspelling wound up in print. Not only in print in the original edition of *Cannery Row* published by Viking Press, but in every English language edition ever printed!

Go ahead, drag out your copy and have a look. Marine biologist Joel Hedgpeth, with whom I had corresponded about this interesting matter in 1982 responded, “Buttlestars indeed. I had never noticed, or if I had, let it pass by. It’s in all editions, the error, and sticks out firmly in the large type edition for the hard of seeing. I also happen to have a copy of the English edition (Heinemann), which is completely reset and note that it is buttlestars there as well.”

What is stranger still is that Ed Rickett’s biographer, Richard Astro, chose this same passage to quote in his work *John Steinbeck and Edward F. Ricketts: The Shaping of a Novelist* (1973), and copied the paragraph and its error, buttlestars and all, into his book. So now it has been preserved in yet another generation of literature. Will the awesome brittlestar ever regain its literary self-respect? Will Viking Press see the error of their ways?

Thankfully, *Sweet Thursday* contains the following description, but with accurate spelling, proving again that John Steinbeck took an abiding interest in and had a real love for what Ed Ricketts called “the good kind and sane little animals.”

“Doc got back from his collecting about four-thirty... and submerged in sea water in his collecting buckets were hundreds of brittlestars. He moved the brittlestars to a large, flat-bottomed glass dish and poured some sea water on top of them. The little animals with the snakelike arms whipped about for a moment and then settled down. When they were quite still and resting Doc added a little fresh water to the dish. The arms stirred nervously. He waited a while and then added a little more fresh water. To a sea animal, fresh water is a poison, and if it is slowly introduced it is as subtle as morphine. It relaxes and soothes until the little creature goes to sleep and dies without violence.”

\*In the Steinbeck collections at Stanford University.

☆☆☆☆☆ SMITHSONIAN INSTITUTION ☆☆☆☆☆  
RESEARCH TRAINING INTERN PROGRAM  
SUMMER 2000

**My Summer working with Dave Pawson**

Let me begin by saying that I have been blessed with the two most amazing mentors in the world: Gordon Hendler and Dave Pawson. This summer I worked with Dave for the first time, and the rest is history.

On March 9, 2000 I received 'good and bad news'. Later I realized it was all good news. The director of the Research Training Program at the Smithsonian Natural History Museum told me that I had been accepted into the program, but the 'bad news' was that I would be working with Dave Pawson. She said this, not because Dave is a mean overbearing ogre, but because he was not my top choice advisor. I had decided to apply to work with whales, stretch my wings a little bit and try out the world of marine vertebrates. Clearly my summer at the Smithsonian was not meant to throw me off of the path of invertebrate research, but to make me more excited about it.

This summer I worked on the ecology of deep-sea feather stars from the Bahama Islands. I spent many hours watching video taken from the Johnson-Sea-Link submersible: giggling at Porter Kier's excitement over swimming crinoids, and absorbing as much information as possible about deep-sea echinoderms like an avid Discovery Channel watcher. I also examined specimens of feather stars that were collected upon the dives, and are now housed in the Smithsonian's collection. Finally I compiled summaries on the feeding behaviors and habitat preferences of each species of feather star. At the end of the ten weeks, I presented my findings orally and in a poster to the Smithsonian community.

My experience at the Smithsonian was one of the best experiences of my life. I learned about feather stars, a neat group I had been previously unfamiliar with. I was also made aware of the exciting possibilities of deep-sea research, an avenue I hope to explore in the future. Best of all, I got to work with Dave Pawson. He gave me advice and guidance that I know will be useful for years to come. I can't forget to mention all the good laughs we had...magnifying headgear can really do wonders for one's looks! Finally, the Smithsonian has the best group of researchers in the world. Not only are they the best in their fields, but they are also the friendliest.

I will never forget this summer.

Elisa Maldonado  
University of California Los Angeles



Dave Pawson and  
Elisa Maldonado  
(Summer Intern)



Dr. Igor Smirnov (Russian Academy of Science, St. Petersburg)  
visited USNM Summer 2000 to continue his taxonomic study of Antarctic ophiuroid

☆☆☆☆☆ BOOK ANNOUNCEMENTS ☆☆☆☆☆

**NEW GERMAN TEXTBOOK**

**SPEZIELLE ZOOLOGIE  
Teil 1: Einzeller und Wirbellose**

**G. Fischer, Stuttgart, 909 pp.**

**(Special Zoology)  
(Part 1: Protists and Evertbrate)**

**edited by W. Westheide and R. Rieger**

**Goldschmid, A. 1996. Chapter 'Echinodermata'**

**The chapter on Echinoderms is written in the context with the other Deuterostomes. (only the Vertebrates are in preparation for part 2.)**

**Chapter: Echinodermata pp. 778-834 including 65 figures, many of the figures (40 composed semi-schematic line drawings, the rest photos).**



## **“The starfish lady”, Maureen Elizabeth Downey, 1921-2000**

by David L. Pawson

Maureen E. Downey, an authority on sea stars, died on May 14, 2000 at the age of 79. She was born in Washington D.C., and she attended George Washington University. In the 1940's she worked for a short time at the Duke University Marine Laboratory in Beaufort, North Carolina, where she first developed a *rapport* with the echinoderms. She returned to the Washington area, and spent approximately ten years with the Central Intelligence Agency and then the U.S. Fish and Wildlife Service, before joining the National Museum of Natural History (NMNH), Smithsonian Institution, in 1957. At first she was a Secretary, then she became involved with the echinoderm collections as a Museum Technician, ultimately becoming a Museum Specialist, continuing her work with the collections and undertaking research on the sea stars.

Maureen had an abiding love of the NMNH - and of the people in it. As a young girl she would bring insects in to the NMNH entomologists for identification. Little did she know then that her fascination with museums would lead her later to a 30-year career as a museum specialist.

Her dedication to the echinoderms was deeply felt, and clearly evident. Even her costume jewelry was “echinodermatological”. She worked long hours during the week, and then would come in to the museum regularly on Saturdays and Sundays to continue her research. The sea stars were her favorites, and she would only occasionally venture into other groups, such as the brittlestars. She and I conspired to found the Echinoderms Newsletter in 1967, and we jointly organized the first International Echinoderms Conference, held here at the NMNH in 1972. The Newsletter has come a long way in the intervening 30 years - back in the old days we would run off 700 copies of each page on an unreliable mimeograph machine, and then collate the newsletters by hand - a tedious operation that would take a few days. And the Echinoderm Conferences have come a long way also - in 1972 the registration fee for the Conference was \$2.00!

Over many years she would visit friends in the Pacific Northwest, especially in Puget Sound, and she spent many happy days and weeks on San Juan Island, site of the University of Washington's Friday Harbor Laboratories. Around 1970 she formulated a plan - to build a home on San Juan Island, and to live there when she retired. She first bought a piece of land, then gradually worked towards construction of her “home-in-the woods”. During the 1980's, as her retirement approached, she was impatient to move to her small northwest paradise, and she often fretted over the fact that the people who were renting and living in her San Juan Island house were enjoying it while she was stuck here in Washington where it was always too hot - or too cold. On her retirement, Maureen moved immediately to San Juan Island, and lived there until her death. She was always ready to welcome visitors at San Juan Island, and several of us from this museum stayed with her at various times over the years. We saw her back in Washington just once, around 1989 - a fateful visit, because while here she fell and broke her hip, and spent several days in the hospital after reconstructive surgery. For the remaining ten years of her life Maureen had difficulty in walking, and this surely hampered her plans to continue with some of her sea star studies at the Friday Harbor Laboratories.

She had a sharp sense of humor, enjoyed a joke, and enjoyed sharing humorous experiences



with her many friends. Maureen was very outspoken; you always knew where you stood with her! She was friendly, hospitable, gregarious, and generous with her time, and she enjoyed meeting visiting scientists and helping them in the collections. In 1964, when I arrived at NMNH as a new curator, Maureen was very kind to me, and made me feel very welcome. She had an abiding interest in arts and crafts, and she numbered among her friends in Washington many prominent local painters, weavers, potters, and sculptors; she acquired several of their works.

Of her research on asteroids and other echinoderms, it can be said that it was extensive, and very valuable. She named numerous new taxa of asteroids, and produced comprehensive larger works on asteroids of the Caribbean and Gulf of Mexico, and Atlantic brisingid asteroids. One new species described by Maureen, *Midgardia xandaros* claimed the title of the 'The World's Biggest Starfish' in the Guinness Book of World Records. The crowning achievement of her career was the 1992 work with Ailsa Clark on starfishes of the Atlantic. Ailsa and Maureen labored mightily and long for many years on that wonderful monograph, and it became an instant classic upon its publication. Finally, Maureen spent much of her time over several years rearranging the echinoderm collection, and making it more accessible. Her work with our very numerous type specimens resulted in the publication of two comprehensive catalogs of types of echinoids and ophiuroids in major North American collections.

Maureen Downey was an impressive and memorable lady, and we were indeed fortunate to have her here at the NMNH during an exciting period in echinoderm research and curation.

#### **Publications of Maureen E. Downey:**

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1971. Two new species of the genus *Tamaria* (Echinodermata: Asteroidea) from the tropical western Atlantic. *Ibid.*, 84(5):43-50.
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1981. A new goniasterid seastar, *Evoplosoma scorpio* (Echinodermata: Asteroidea), from the northeastern Atlantic. *Ibid.*, 94(2):561-563.
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☆☆☆ PAPERS PRESENTED AT CONFERENCES ☆☆☆

10TH INTERNATIONAL ECHINODERM CONFERENCE

31 January to 4 February, 2000

University of Otago, Dunedin, New Zealand  
in Programme and Abstracts

CONTRIBUTED ORAL PAPERS

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Améziane, Nadia, and Michel Roux. The Seamount crinoid fauna off southern Tasmania (preliminary results). A33

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Arakaki, Y. Black *Echinometra* inhabiting in the Indo-Pacific Ocean is a species complex. A35

Barrett, Dennis, Christopher C. Romero, and Justin L. Mott. Functions of the sea urchin fertilization envelope. A36

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- Conand, C., and S. Jaquemet. Overview on the last decade of sea cucumber fisheries, what means for a durable management? A45
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- Eagle, Michael K. New Mesozoic echinoderms (*Serpianotiaris*: Evechinoidea; *Cottreauaster*: Asteroidea) from New Zealand. A51
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JUNE 2000  
PROGRAM WITH ABSTRACTS**

**Communicated by Susan Hottenrott**

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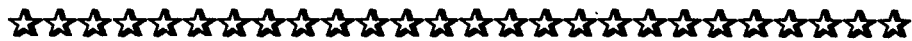
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**Papers on Echinoderms presented at the XV Zoology National Congress,  
November 9<sup>th</sup>-12<sup>th</sup> 1999, Tepic, Nayarit, Mexico.**

**Communicated by Israel Fabricio Barbosa-Ledesma**

Barbosa-Ledesma, Israel Fabricio; Solís-Marín, Francisco Alonso y Frontana-Uribe, Sarita Claudia. Distribución geográfica de las especies del género *Hesperocidaris* (Echinodermata: Echinoidea) en el Pacífico Americano.

Barbosa-Ledesma, Israel Fabricio; Solís-Marín, Francisco Alonso; Frontana-Uribe, Sarita Claudia y Laguarda-Figueras, Alfredo. La familia Cidaridae (Echinodermata: Echinoidea) y su distribución en las costas mexicanas.

Frontana-Uribe, Sarita Claudia y Solís-Marín, Francisco Alonso. Listado sistemático de los equinodermos (Echinodermata) de la Isla Cocina, Jalisco, México.

Frontana-Uribe, Sarita Claudia; Hernández-Alcántara, Pablo y Solís-Weiss, Vivianne. Listado sistemático de los equinodermos (Echinodermata) de la Isla Socorro, Archipiélago de las Revillagigedo, México.

Martínez-Lorenzo, J. L.; Álvarez-Hernández, J. H.; Castro, P. J. M.; González-López, W. A.; Franco, C. A. y Medina, G. M. Equinodermos asociados al arrecife de tipo borde en Mahahual, Quintana Roo, México.

Oliva-Rivera, José Juan; Valtierra-Vega, Teresa; Quintero-López, Nancy; Valencia-Beltrán, Victor y Betancurt-De la Fuente, Gabriela. Estudio preliminar de la abundancia del erizo blanco *Tripneustes ventricosus* (Lamarck) en Banco Chinchorro, Quintana Roo.



## **Papers on Echinoderms presented at the XII Oceanographic National Congress, May 22<sup>th</sup>-26<sup>th</sup> 2000, Huatulco, Oaxaca, Mexico.**

**Communicated by Israel Fabricio Barbosa-Ledesma**

Acosta Bustillos, Luz Elena. Composición química de erizo rojo y morado (*Strongylocentrotus franciscanus* y *S. purpuratus*) en Baja California.

Barbosa-Ledesma, Israel Fabricio y Laguarda-Figueras Alfredo. Variación de las subespecies de *Lytechinus variegatus* (Lamarck) (Echinodermata: Echinoidea) en el Golfo de México.

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Benítez Villalobos, Francisco; Leyte Morales, Gerardo E. y Ramírez Luna Silvia. Comunidades de equinodermos asociadas a la zona arrecifal Puerto Escondido-Bahías de Huatulco, Oaxaca, México.

Corrales Urrea, José Ramón. Elaboración de pate de erizo.

Frontana-Uribe, Sarita Claudia; Mata-Pérez Eustolia; Laguarda Figueras Alfredo y Camarena Hernández Luz María. Contribución al conocimiento de los equinodermos (Echinodermata) de las costas de Oaxaca y su distribución geográfica en el Pacífico mexicano.

Frontana-Uribe, Sarita Claudia, Hernández-Alcántara Pablo y Solís-Weiss Vivianne. Distribución geográfica de las especies de poliquetos (Annelida: Polychaeta) y equinodermos (Echinodermata) del Archipiélago de Revillagigedo, México.

Holguín Quiñones, Oscar E. y Wright López Humberto. Distribución y abundancia del erizo café *Tripneustes depressus* en la Isla San José, Golfo de California.

Holguín Quiñones, Oscar E., Wright López Humberto y Felix Pico, Estebán F. Moluscos y equinodermos de la Isla San José, Golfo de California.

Prieto Montalvo, Irene, Barrera Moreno Aurora e Contreras Riva Ignacio. Aplicación del sistema de análisis de riesgos y puntos críticos para procesar gonáda de erizo.

Ramírez Soberón, Georgina; Fernández Méndez, José I. y Gaspar-Dillanes, Ma. Teresa. Propuestas de manejo para el aprovechamiento sustentable del pepino de mar en México.



**IV JOURNEIS OF SCIENCES OF THE SEA  
PUERTO MADRYN, ARGENTINA  
11- 15 SEPTEMBER 2000**

**Communicated by Cynthia Tamara Rubilar Panasiuk**

**POSTER PRESENTATIONS**

Brogger, M., and P.E. Penchaszadeh. Trophic interaction between two starfish of sand depth (25-30m of depth) in Quequén, Prov. of Buenos Aires, Argentina.

Dolcemascolo, J.A., and H. Zaixsi. Ecological aspects of the sea urchin *Abatus cavernosus*, in the Deseada estuary, Provincia de Santa Cruz, Argentina.

Díaz de Vivar, M.E. Polar metabolites of the starfish *Allostichaster inaequalis* (Koehler, 1923) in New Gulf, Puerto Madryn, Argentina.

Rubilar Panasiuk, C.T., and M.E. Díaz de Vivar. Study of the quality and quantitative of the lipids of the starfish *Allostichaster inaequalis* (Koehler, 1923) in New Gulf, Puerto Madryn, Argentina.



**Advanced Workshop in Honour of Eizo Nakano:  
Sea Urchin Aquaculture**

**Communicated by Yukio Yokota**

**IMC - International Marine Centre November, 2000**

**Scope:** The aim of the workshop is to introduce the modern concept of resource management of sea urchin stock and to transfer advanced techniques and know-how in the sea urchin aquaculture. For this purpose,

specialists in the field of sea urchin biology/aquaculture are invited from Europe, USA and Japan as lecturers. The workshop offers participants both theoretical and practical lessons. Fifteen lectures are invited for the understanding of the biological background and resource management of sea urchin stock. The practical course will be held with a number of teaching assistants for the acquisition of advanced techniques in sea urchin aquaculture. This workshop is dedicated to the memory of Eizo Nakano who died in October 1999. He was always at the cutting edge of the field of sea urchins biology and organised many international workshops as a founder of the IMC. If you wish to receive more information, please return the pre-registration form below by e-mail/fax/post. Further information can be found on our webpage. URL: <http://www.imc-it.org/seaurchin>

#### Topics

1. Biological aspects of the sea urchin.
2. Effects of environmental changes on natural sea urchin stock.
3. Technical aspects of sea urchin aquaculture.
4. Impact of sea urchin aquaculture on the environment.
5. Sustainable sea urchin resource management.

Venue IMC - International Marine Centre, Torregrande, Sardinia, Italy

Date 20 November - 1 December, 2000

Sponsored by (Planned) European Commission (EU), Consiglio Nazionale delle Ricerche (CNR), Regione Autonoma della Sardegna, Alitalia, Carl Zeiss, etc.

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#### Organising Committee

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Dr. Yukio Yokota, LC, Aichi Prefectural University, Japan  
Dr. Giovanni Giudice, LC Università di Palermo, Italy  
Dr. Valeria Matranga, LC IBS-CNR, Italy  
Dr. Joe Hirano, HS, LC IMC, Italy  
Dr. Rosalba Murgia, HS IMC, Italy  
Dr. Maura Baroli, HS IMC, Italy

#### Title of lectures

S. Amemiya. Developmental modes and rudiment formation in sea urchins.

A. Cameron. To be announced.

R. Emlet. Ecology of adult sea urchins.

- R. Emllet. Larval ecology: food ratios, developmental rates and size at metamorphosis.
- C. Falugi. Biological effects of neurotoxic pesticides on sea urchin embryo development: a terathogenic assay.
- G. Giudice. Developmental biology of the sea urchin.
- H. Gundlach. Microscopy from the very beginning.
- J. Hirano. DNA techniques.
- V. Matranga. Effects of pollution and UV radiation on sea urchin cells, embryos and larvae.
- A. Neori. Land-based culture of seaweed as feed for the sea-urchin.
- M. C. Roccheri. Physiological and induced apoptosis in sea urchin embryos and larvae.
- M. Shpigel. Land-based culture of sea urchins.
- T. Unuma. Gonadal growth of sea urchins and its relevance to aquaculture.
- I. Yazaki. Metamorphosis of sea urchins: A prospective mechanism of larval death and rudimental life induced by chemicals and natural cues.
- Y. Yokota. Introduction to the biology of the sea urchin.
- Y. Yokota. Fishery and aquaculture of sea urchins in Japan.



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## NEWSLETTER #25 SUPPLEMENT

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☆☆☆☆☆ Recent Publications ☆☆☆☆☆

Agatsuma, Y. 1999. Gonadal Growth of the Sea Urchin *Strongylocentrotus nudus* from tropically poor coralline flats and fed excess kelp, *Laminaria religiosa*. SUISANZOSHOKU, 47, 325-330.

Agatsuma, Y., A. Nakata, and K. Matsuyama . 2000. Seasonal foraging activity of the sea urchin *Strongylocentrotus nudus* on coralline flats in Oshoro Bay in southwestern Hokkaido, Japan. Fisheries Science, 66:204-210.

Agatsuma, Y. 2000. Food Consumption and Growth of the Juvenile Sea Urchin *Strongylocentrotus intermedius*. Fisheries Science, 66:467-472.

Christensen, A.B., and J.M. Colacino. 2000. Respiration in the burrowing brittlestar, *Hemipholis elongata* (Say) (Echinodermata, Ophiuroidea): A study of the effects of environmental variables on oxygen uptake. Comparative Biochemistry and Physiology A, (in press).

Mashanov, V. S., and I.Yu. Dolmatov. Regeneration of digestive tract in the pentactulae of the far-eastern holothurian *Eupentacta fraudatrix* (Holothuroidea, Dendrochirota). Invertebrate Reproduction and Development. (in press).

Neumann, C. 2000. Evidence of predation on Cretaceous sea stars from north-west Germany. Lethaia, 33:65-70.

Neumann, C. 1999. New spatangoid echinoids (Echinodermata) from the Upper Cretaceous of Jordan: their taxonomy and phylogenetic importance. Berliner geowiss. Abh., E30: 175-189.

Neumann, C. Spatangoid and holasteroid echinoids as a key to a better understanding of the Chalk Sea? - A comparative study of the palaeoecology of Late Cretaceous nearshore and hemipelagic echinoid assemblages from NW Germany. **The 150th Anniversary of the Maastrichtian Stage: A Celebratory Conference, Natuurhistorisch Museum Maastricht, 17-21 November 1999, pp.48-49 in Conference programme, abstracts and field guide (Anne S. Schulp, John W.M. Jagt & Douwe Th. De Graaf, eds.).**

O'Loughlin, P. Mark, and Nicola Alcock. 2000. The New Zealand Cucumariidae (Echinodermata, Holothuroidea). *Memoirs of Museum Victoria*, 58(1): 1-24.  
O'Loughlin, P. Mark. 2000. A review of the Cucumarid genus *Psolidiella* Mortensen (Echinodermata, Holothuroidea). *Memoirs of Museum Victoria*, 58(1): 25-37.

☆☆☆☆☆ **Current Research** ☆☆☆☆☆

Agatsuma, Y. Population ecology of the sea urchins in southern Japan.

Christensen, A.B. - Comparison of the respiratory physiology and hemoglobins of *Ophiactis rubropoda* and *Ophiactis simplex* (Echinodermata, Ophiuroidea); hypoxia tolerance in *Hemipholis elongata*.

Estremadura, D.M. - Recruitment and settlement of holothurian larvae.

Gonzalez Pelaez, S.S. - Population biology of *Tripneustes depressus* (Agassiz) in the southern Gulf of California Mexico (dissertation, in progress).

Mashanov, V.S. - regeneration of the digestive tube in holothurians, individual development of lecithotrophic holothurians; cellular mechanisms of regeneration in holothurians and developmental biology of echinoderms.

McAloon, K. - Trace metal solubilization by intestinal fluid of *Sclerodactyla briareus*.

Neumann, C. - Post-larval development of Cretaceous hemiasterid echinoids; origin of urechinid echinoids; Cretaceous dee-sea echinoids from Spain.

☆☆☆☆☆ **Requests** ☆☆☆☆☆

Christensen, A.B. - I'm looking for live specimens of *Ophiactis rubropoda*, *Ophiactis simplex*, and *Ophiactis virens* for a comparison of ophiuroid hemoglobins. Please contact me at [christenab@hal.lamar.edu](mailto:christenab@hal.lamar.edu)

Estremadura, D.M. - I would appreciate receiving any publications about recruitment and settlement of holothurian larvae. Please contact me at [s3madura@popmail.i-next.net](mailto:s3madura@popmail.i-next.net)

McAloon, K. - I am looking for a good picture of *Sclerodactyla briareus* to include in a presentation. If anyone has one or knows of one available please let me know. Thanks [mcaloon@cbl.umces.edu](mailto:mcaloon@cbl.umces.edu)

☆☆☆☆☆ Dissertations ☆☆☆☆☆

A.M. Beardsley. 1997. The hemoglobins and respiratory physiology of the burrowing brittlestar, *Hemipholis elongata* (Echinodermata, Ophiuroidea). Ph.D., Clemson University, Clemson, SC.

D.M. Estremadura. 2000. Assessment of holothurian resources around Taklong Island, Guimaras. B.S. Biology, University of the Philippines-Visayas.

☆☆☆☆☆ Specialists Keywords ☆☆☆☆☆

Christensen, Ana Beardsley OPHIUROIDEA PHYSIOLOGY RESPIRATION BEHAVIOR

Estremadura, D.M. PHYSALIUS

Mashanov, V.S. HOLOTHUROIDEA REGENERATION DEVELOPMENT

Neumann, Christian TAXONOMY PALAEOBIOLOGY CRETACEOUS ECHINOIDEA ASTEROIDEA



**Urchin's clue to male infertility**

A STUDY of the sex lives of sea urchins may lead to new treatments for male infertility (Nigel Hawkes writes). Research in the United States has solved a long-standing mystery about how sperm fertilises a female egg.

Experiments on sea urchins from the Pacific showed that nitric oxide gas inside the sperm triggers development in the egg: the sperm contains an enzyme called nitric oxide synthase which remains inactive until a few seconds before fertilisation.

David Epel, from Stanford University's Hopkins Marine Station on Monterey Bay in California, said, in *Nature*: "There are lots of defects in human sperm, and there could well be deficiencies in nitric oxide concentrations in the sperm of some males.

"If this were the case, a procedure might be developed that uses nitric oxide to treat male infertility," he added.

Contributed by

Francisco Solis-Marin

The Times

Thursday, August 10<sup>th</sup>, 2000