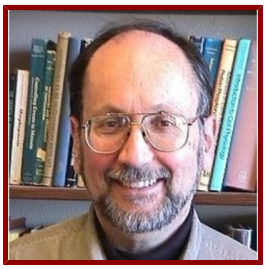
Stanford



David Epel

Jane and Marshall Steel Jr. Professor of Marine Sciences, Emeritus

Biology

Bio

BIO

David Epel is the Jane and Marshall Steel Jr. Professor Emeritus of Biological Sciences at Stanford University's Hopkins Marine Station in Pacific Grove, California. His research in reproductive biology led to foundational discoveries in cell division, fertilization, and ecological developmental biology (eco-devol-biology). Over a career spanning more than four decades, he mentored generations of scientists and helped establish new directions in developmental and environmental biology.

Professor Epel has been an author of 200 research papers. He is co-author, with Scott Gilbert, of Ecological Developmental Biology (2009; 2nd ed. 2015), the first textbook defining the eco-devo (ecological and developmental biology) field.

Epel was Assistant Professor at Hopkins Marine Station from 1965-1970. He accepted an appointment as Associate Professor at Scripps Institute of Oceanography in 1970 and was appointed Professor there in 1973. He returned to Hopkins as a Professor in 1977 and was the first holder of the Jane and Marshall Steel Jr. Chair in Marine Sciences. He retired in 2009. His Stanford teaching included being Resident Professor in the Stanford Overseas Program at Oxford University in 2002. He also led Stanford Alumni Educational Travel Programs to Baja California, Belize, Alaska, and the Galápagos Islands in the 1980's.

Epel was also on the faculty of the iconic Summer Courses at the Marine Biological Laboratory in Woods Hole. These included the Gamete Physiology Course in 1972 and as co-Director of the Embryology Course in the summers of 1975-1977.

Internationally he was on the faculty of two UNESCO course sin Gamete Physiology that focused on students from Africa and the Middle East. He was on the faculty of the National Science Foundation International Course in Polar Biology at the McMurdo Station in Antarctica in 1996.

He has served on the boards of the Monterey Bay Aquarium, Monterey Bay Aquarium Research Institute, the Executive Committee of the Ventana Chapter of the Sierra Club, and as an advisor to the Osher Lifelong Learning Institute at CSU Monterey Bay.

David Epel was born in 1937 and raised in Detroit, Michigan. His father, an immigrant from Lithuania, was a rabbi, and his mother was from Russia. He grew up in a household that valued learning, intellectual curiosity, and public service.

A formative influence in his life was his older brother, Joseph. Joseph was sixteen years his senior, had a PhD in physical chemistry and played a decisive role in fostering David's early interest in science. As a boy, David persuaded his father to purchase a mail-order microscope advertised in a comic book, which promised to reveal a fascinating microscopic world. Although the microscope itself was of poor quality, the accompanying book captured his imagination.

Recognizing his enthusiasm, Joseph later found his younger brother a well-used but high-quality 1892 Zeiss microscope. This allowed David to culture protozoa and explore biology firsthand. This early exposure to microscopy and experimental observation set the course for his lifelong engagement. David's younger brother, Bernard, was also influenced by Joseph and also went on to earn a PhD in the life sciences.

Professor Epel lives in Carmel, California, with his wife, Lois Ambush Epel. They have three daughters and four grandchildren.

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Biology
- Affiliate, Stanford Woods Institute for the Environment

ADMINISTRATIVE APPOINTMENTS

- Interim Director, Hopkins Marine Station, Stanford University, (1984-1988)

HONORS AND AWARDS

- M. Patricia Morse Award for Excellence and Innovation in Science Education, Society for Integrative and Comparative Biology (2020)
- Life Fellow of Clare Hall, Clare Hall, Cambridge University, UK (2007)
- Ed Ricketts Memorial Lecture Award for Lifetime Achievement in Marine Sciences, Monterey Bay National Marine Sanctuary (2006)
- Academy Fellow, California Academy of Sciences (2000)
- Medal for Fostering Excellence in Undergraduate Research, Stanford University (1995)
- Fellow of the American Association for the Advancement of Science, American Association for the Advancement of Science (1978)
- Guggenheim Fellowship, Guggenheim Fellowship (1977)
- Overseas Fellow, Churchill College, Cambridge University UK (1976-1977)

PROFESSIONAL EDUCATION

- Postdoctoral Fellow, University of Pennsylvania Medical School Johnson Research Foundation Laboratory under the direction of Britton Chance , Cell Biology (1965)
- PhD, UC Berkeley, Berkeley CA, under the direction of Daniel Mazia , Cell Biology (1963)
- BA, Wayne State University, Detroit Michigan , Biology (1958)

COMMUNITY AND INTERNATIONAL WORK

- Community and International Work
- null

PATENTS

- David Epel, Richard Kuo. "United States Patent US-20020106360-A1 Methods for Modulation of Oocyte Activation", Leland Stanford Junior University, Cornell University, Aug 8, 2002

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Ecological Developmental Biology

Beginning in the 1990s, Professor Epel's research switched to how embryos can survive in and adapt to stressful and changing environments. This work helped establish ecological developmental biology as a distinct field and led to publication of Ecological Developmental Biology with Scott Gilbert, the first book to look at how embryos respond to environmental stress

Embryonic defense against environmental toxins via multidrug transporters that efficiently expel pollutants at environmentally relevant concentrations

Symbiotic microbial defenses in marine embryos, including work demonstrating bacterial protection of squid eggs during extended development on the ocean floor

Dr Epel is hosting the inaugural Ecological Developmental Biology Summit at Stanford's Hopkins Marine Station in April 2026. This summit's theme is Eco-Evo-Devo: The Next Frontier. https://events.stanford.edu/event/the-ecological-developmental-biology-symposium

Publications

PUBLICATIONS

- **When sperm meets egg-Fifty years of surprises.** *Methods in cell biology*
  Epel, D.
  2019; 151: 3–12
- **When sperm meets egg-Fifty years of surprises** *ECHINODERMS, PT B*
  Epel, D.
  edited by Hamdoun, A., Foltz, K. R.
  2019; 151: 3–12
- **Cost, effectiveness and environmental relevance of multidrug transporters in sea urchin embryos** *JOURNAL OF EXPERIMENTAL BIOLOGY*
  Cole, B. J., Hamdoun, A., Epel, D.
  2013; 216 (20): 3896-3905
- **Virtual Ocean Acidification Laboratory as an Efficient Educational Tool to Address Climate Change Issues** *2nd Worlds Online Climate Change Conference (Climate 2009)*
  Fauville, G., Hodin, J., Dupont, S., Miller, P., Haws, J., Thorndyke, M., Epel, D.
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- **Multidrug Efflux Transporters Limit Accumulation of Inorganic, but Not Organic, Mercury in Sea Urchin Embryos** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*
  Bosnjak, I., Uhlinger, K. R., Heim, W., Smital, T., Franekic-Colic, J., Coale, K., Epel, D., Hamdoun, A.
  2009; 43 (21): 8374-8380
- **Multidrug resistance-associated protein (MRP) protects sea urchin embTyos (Strongylocentrotus purpuratus) against mercuric chloride**
  Bosnjak, I., Epel, D., Johnson, K., Eoliae, J. F., Smital, T., Hamdoun, A. M.
  ELSEVIER SCI LTD.2008: 83–83
- **Efflux transporters: Newly appreciated roles in protection against pollutants** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*
  Epel, D., Luckenbach, T., Stevenson, C. N., Macmanus-Spencer, L. A., Hamdoun, A., Smital, T.
  2008; 42 (11): 3914-3920
- **ABCB- and ABCC-type transporters confer multixenobiotic resistance and form an environment-tissue barrier in bivalve gills** *AMERICAN JOURNAL OF PHYSIOLOGY-REGULATORY INTEGRATIVE AND COMPARATIVE PHYSIOLOGY*
  Luckenbach, T., Epel, D.
  2008; 294 (6): R1919-R1929
- **Apoptosis in early development of the sea urchin, Strongylocentrotus purpuratus** *DEVELOPMENTAL BIOLOGY*
  Thurber, R. V., Epel, D.

2007; 303 (1): 336-346

- **Embryo stability and vulnerability in an always changing world** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Hamdoun, A., Epel, D.
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- **The chemical defensome: Environmental sensing and response genes in the Strongylocentrotus purpuratus genome** *DEVELOPMENTAL BIOLOGY*
  Goldstone, J. V., Hamdoun, A., Cole, B. J., Howard-Ashby, M., Nebert, D. W., Scally, M., Dean, M., Epel, D., Hahn, M. E., Stegeman, J. J.
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- **The genome of the sea urchin Strongylocentrotus purpuratus.** *Science*
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- **Research article - The genome of the sea urchin Strongylocentrotus purpuratus** *SCIENCE*
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- **Implications for perfluorochemical ecotoxicology: Inhibition and induction of an efflux transporter in the marine mussel, Mytilus californianus**
  Stevenson, C., Macmanus-Spencer, L. A., Luckenbach, T., Luthy, R. G., Epel, D.
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- **New perspectives on perfluorochemical ecotoxicology: inhibition and induction of an efflux transporter in the marine mussel, Mytilus californianus** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*
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  Luckenbach, T., Epel, D.
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- **Using cell and developmental biology to enhance embryo survival in aquaculture** *AQUACULTURE INTERNATIONAL*
  Epel, D.
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- **Activation of multidrug efflux transporter activity at fertilization in sea urchin embryos (Strongylocentrotus purpuratus)** *DEVELOPMENTAL BIOLOGY*
  Hamdoun, A. M., Cherr, G. N., Roepke, T. A., Epel, D.
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  Thaler, C. D., Kuo, R. C., Patton, C., Preston, C. M., Yagisawa, H., Epel, D.
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  Smital, T., Luckenbach, T., Sauerborn, R., Hamdoun, A. A., Vega, R. L., Epel, D.
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- **Some precautions in using chelators to buffer metals in biological solutions** *CELL CALCIUM*
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- **Development in the floating world: Defenses of eggs and embryos against damage from UV radiation** *Symposium on Aquatic Organisms, Terrestrial Eggs - Early Development at the Waters Edge, at the Annual Meeting of the Society-for-Integrative-and-Comparative-Biology*
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- **Regulation of the pentose phosphate pathway at fertilization in sea urchin eggs** *7th International Congress on Invertebrate Reproduction*
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- **A MULTIXENOBIOTIC TRANSPORTER IN URECHIS-CAUPO EMBRYOS - PROTECTION FROM PESTICIDES** *7th International Symposium on Responses of Marine Organisms to Pollutants*
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- **MULTIXENOBIOTIC RESISTANCE IN URECHIS-CAUPO EMBRYOS - PROTECTION FROM ENVIRONMENTAL TOXINS** *BIOLOGICAL BULLETIN*
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- **A ROLE FOR STRUCTURAL-CHANGES IN CELL ACTIVATION AT FERTILIZATION - DIFFERENTIAL INHIBITION OF ENZYMATIC-ACTIVITIES** *SYMP ON STRUCTURAL AND ORGANIZATIONAL ASPECTS OF METABOLIC REGULATION*
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