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American Society of Naturalists Honorary Lifetime Membership Awards

Jane Lubchenco

The American Society of Naturalists is pleased to award Jane Lubchenco an Honorary Lifetime Membership. Jane received her BA in biology from Colorado College, an MS in zoology from the University of Washington, and her doctorate from Harvard University, studying with Tom Schoener and Fred Smith. One paper from her dissertation, "Plant species diversity in a marine intertidal community: importance of herbivore food preference and algal competitive ability" (*American Naturalist* 112: 23–39, 1978), has been cited more than 929 times. The paper describes a bell-shaped relationship between grazer density and algal species richness and was an early depiction of what has become known as the intermediate disturbance hypothesis. It also identifies the hallmarks of Jane's early research: a focus on algal-animal interactions on rocky intertidal shores explored by experimental manipulations. Her studies played a critical role in broadening a more traditional phycology to include a significant animal role in algal biology. Jane credits her continuing interest in research and marine biology to a summer class she took as an undergraduate at Woods Hole Research Center.

In many respects her career represents a remarkable and still-evolving blend of research and broader, more political leadership positions. It is these latter that make Jane so unusual. She helped develop the structure of shared appointments when she moved with her husband and fellow ecologist, Bruce Menge, to Oregon State University. Their collaboration resulted in the Ecological Society of America's Mercer Award for low intertidal studies in New England. In their research, Jane focused on herbivores and benthic algae while Bruce focused on animal-animal interactions. A conspicuous feature of their combined endeavors was a potent mix of natural history, experimental manipulations, and hypothesis testing. The result: pioneering studies on community organization on rocky shores, first in New England, and subsequently Panama, Oregon, Chile, and New Zealand. For her central role in these studies, Jane was awarded the John D. and Catherine T. MacArthur Foundation Fellowship, known as the "genius grant."

Jane, however, has also provided a model of how scientists might take the next and increasingly necessary step of effective involvement in the political processes that direct and fund our endeavors. She has cofounded three organizations: the Leopold Leadership Program, the Communications Partnership for Science and the Sea, and Climate Central. Their goal is the effective communication of scientific knowledge to policy makers, industry, the media, and ultimately the public. Furthermore, Jane actively endorsed these goals while serving as President of the Ecological Society of America and the American Association for the Advancement of Science by emphasizing the necessity of resource sustainability. Other high-level positions include a decade on the National Science Board, the group that determines policies and priorities at the National Science Foundation, and membership in the Pew Ocean Commission. Recognition has of course followed. In no chronological order and among many, this includes election to the US National Academy of Sciences and the American Philosophical Society. She has received at least 18 honorary degrees.

With this award, our society is recognizing a stellar research record focused on the organization and structure of marine rocky intertidal assemblages. Ironically, in contrast, she is probably best known to the public for her four-year stint as the National Oceanic and Atmospheric Adminstration (NOAA) administrator. The breadth of her administrative responsibilities there, touching as they did many environmental factors, was awesome: for instance, increasing the sustainability of commercial fisheries, improving the ability to predict severe weather and to better understand the consequences of a changing global climate, promoting an expanded ability for satellites to monitor our environment, and creating procedures to ensure scientific integrity at NOAA. Early in her tenure the Deepwater Horizon oil spill disaster occurred, placing Jane and therefore NOAA science in the center of the communication war between British Petroleum and state and federal agencies. Her communication and people skills served her well during this major environmental crisis, for which *Nature* (468:1024–1028, 2010) recognized her as "Newsmaker of the Year: In the Eye of the Storm."

I find it difficult to summarize a career so packed with notable accomplishments ranging from basic and often novel ecological research to leadership roles at national and international levels. Sustainability issues and marine protected areas have attained prominence in both scientific and public domains. She has become the model for environmental biologists of how to parley scientific excellence into important, high-level public service. I believe she has added a new dimension to our society's stated goal, "the conceptual unification of the biological sciences."

Robert T. Paine, on behalf of the ASN Executive Committee

Joseph Felsenstein

The American Society of Naturalists is pleased to announce that Joseph Felsenstein has been named as an Honorary Lifetime Member in recognition of his major contributions to the conceptual unification of the biological sciences. Joe is probably best known for his work in the area of phylogenetics, but what is so notable about his career is the significance of the contributions he has made to a broad range of disciplines. Reading his papers, one is always struck by his prescience; not only did he solve challenging problems, but he did so before anyone else was even thinking about them.

Joe has had an extraordinary influence in shaping modern phylogenetics and comparative biology. His 1973 *Systematic Zoology* paper on likelihood methods (22:240–249) and 1981 *Journal of Molecular Evolution* paper on the "pruning algorithm" (17:368–376) opened the door for statistical inference of phylogenetic trees, while his demonstration of the inconsistency of parsimony (in the "Felsenstein zone" [*Systematic Zoology* 27:401–410, 1978]) pushed the field through it. He developed the bootstrap support measure, the most widely used method for evaluating statistical support for nodes in a phylogeny (*Evolution* 39:783–791, 1985). Even more astounding than the fact that this paper has been cited over 23,000 times is the fact that it only accounts for ~30% of his citations (Google Scholar). Many people may not appreciate that he was also the first to develop the concept of Bayesian phylogenetic inference (in his doctoral thesis in 1968!), literally decades before anyone else worked on this topic.

Phylogenetic comparative biology is now a major component of evolutionary research, with an abundance of models and methods that use phylogenies to make inferences about adaptation, evolutionary correlation between characters traits, ancestral states, and the tempo and mode of evolution through time. It would not be an exaggeration to say that this entire field is an outgrowth of Joe's work, particularly his independent contrasts method (*American Naturalist* 125:1–15, 1985) and more generally his insight into how to model the evolution of traits along a phylogeny (*Annual Review of Ecology and Systematics*, 19:445–471, 1988). Moreover, he continues to make unique and important contributions to the field of comparative biology. His recent work investigates fundamental issues such as the sampling process of traits at the tips of the tree of life (*American Naturalist* 171:713–725, 2008), the application of comparative methods to threshold traits (*American Naturalist* 179:145–158, 2012), and likelihood methods for incorporating fossils into phylogenies (unpublished).

Joe's enormous contributions to phylogenetics and comparative biology perhaps make it easy to overlook the fact that he made seminal contributions to other areas of evolutionary biology. His paper on the sensitive conditions required for sympatric speciation (*Evolution* 35:124–138, 1981) is a landmark paper that clearly laid out the issues with which researchers continue to grapple to this day. His paper on the evolutionary value of recombination (*Genetics* 78:737–756, 1974) brought conceptual clarity to a difficult field. He was also instrumental in the initial development of methods for fitting coalescent models to sequence data (e.g., Kuhner et al., *Genetics*, 1995; Beerli and Felsenstein, *Proceedings of the National Academy of Sciences U.S.A.*, 2001), which helped spawn modern empirical population genetics. Plus, for the geeks among us, there is his delightfully titled "A pain in the torus: some difficulties with models of isolation by distance" (*American Naturalist* 109:359–368, 1975) in which he reveals a vexing problem with simple models of migration and reproduction in continuous space: populations inextricably clump, a problem that continues to inspire cutting-edge work in population genetics. These are only a small sampling of the work he has done in evolutionary theory.

In many ways, evolutionary biology is still catching up with Joe's genius. For example, his paper on macroevolution of ecosystems (*American Naturalist* 112:177–195, 1978) is an underappreciated gem. In that paper, he presented a novel approach to thinking about macroecology and the way in which ecosystem functioning is shaped by the evolution of its constituent species. The interplay between evolution and ecosystem ecology has recently received renewed interest, and it will not be surprising when researchers look back at Joe's approach and realize that once again he foresaw the essence of the problem.

On a personal level, Joe has always been extremely generous with his time and insight and has been an outstanding mentor and teacher to many evolutionary biologists, especially young researchers in the field. Joe was also an early leader in promoting accessible software programs and codes, making his software freely available and establishing a tradition that has had a huge positive effect on the community, allowing us all to stand on his great shoulders.

Jonathan B. Losos, **Sarah Perrin Otto**, and **Matthew Pennell**, on behalf of the ASN Executive Committee

Richard C. Lewontin

The American Society of Naturalists is pleased to award Richard C. Lewontin an Honorary Lifetime Membership. Dick has been a major intellectual presence in population biology for many decades. He did his PhD in 1954 with Theodosius Dobzhansky at Columbia and began his career at the University of North Carolina (where he helped Buckminster Fuller with the geometry of geodesic domes). In 1958, he moved to the University of Rochester, and in 1964, he was appointed professor of biology at the University of Chicago. While at Chicago, he was coeditor of the *American Naturalist* (1964–1969), associate dean of biological sciences, and chair of the program in evolutionary biology. He moved to Harvard University in 1973 as the Alexander Agassiz Professor of Zoology and Professor of Biology, and after 1999 has been the Alexander Agassiz Research Professor at Harvard's Museum of Comparative Zoology.

Dick is probably most famous for showing that many loci in *Drosophila* were polymorphic, with a large number of alleles being maintained in nature. His papers on this subject with Jack Hubby (the first in *Genetics* 54:577–594, 1966) were the first to quantify allelic diversity using electrophoresis, and they launched the molecular study of genetic diversity that Dick continued with many of his students. He is almost equally famous for the intellectual rigor and theoretical originality that he brought to the question, why do we see so much genetic variation in nature? His answer to that was multifaceted and began with his analysis of equilibria determined by two loci in his 1960 paper with Kenichi Kojima (*Evolution* 14:458–472), a paper that Dick liked to call his "Mouton Rothschild 1960." Over the years since then, Dick has argued that multilocus interactions, gene-environment interactions, historical contingency, niche construction, and biological interactions all have a role in determining ecological and evolutionary outcomes. In *The Genetic Basis of Evolutionary Change* (1974, Columbia University Press, New York), he lays out both empirical facts and theory as of 1974. This is a book about which Joe Felsenstein (one of many justly celebrated Lewontin students) said, "its breadth, accuracy, and profundity [...] will be illuminating to population biologists and geneticists. No graduate student in these areas should be allowed to receive a degree before reading it" (book review, *Evolution* 29:587–90, 1975). These words are still true.

In population biology more broadly, Dick launched and nurtured many novel theoretical developments. He was the first to introduce game theory into evolutionary biology (*Journal of Theoretical Biology* 1:382–403, 1961); to perform sensitivity analyses of a life history to analyze the key importance of development time and juvenile mortality to fitness (pp. 79–94 in H. G. Baker and G. L. Stebbins, eds. *The Genetics of Colonizing Species*, 1965, Academic Press); to establish, with Dan Cohen, the essential theory of how random environments affect population growth (1974, PNAS 62:1056–1060). He drove home the importance of variation and its meanings, highlighting the key fact that genetic variance within groups vastly exceeds variance between groups—a fact that is echoed in many other human characteristics (including age at death and wealth). His classic papers on human diversity (pp. 381–398 in T. Dobzhansky, M. K. Hecht, and W. C. Steere, eds. *Evolutionary Biology*, 1995, Springer) and the analysis of variance (*International Journal of Epidemiology* 35:520–25, 2006) are essential reading.

Dick was an early and sustained critic of what he termed "vulgar adaptationism," in which (almost) every pattern observed in nature is explained in terms of the maximization of some underlying adaptive value. Quite apart from the tautological dangers of this approach, an unrestrained enthusiasm for adaptationist arguments can be a threat to the development of a predictive evolutionary biology. Dick debated these questions with John Maynard Smith in a wonderful lecture series at Harvard in 1977 (sadly, no video recording of those lectures appears to exist). His critical perspective on adaptation was shared by his brilliant colleague Steven Jay Gould, and they wrote a delightful paper on the subject that should also be required reading for every graduate student in population and evolution (*Proceedings of the Royal Society B: Biological Sciences* 205:581–598, 1979).

Dick Lewontin has maintained a sustained interest in the philosophy and history of science and supported and inducted many eminent scholars into the study of the philosophy of evolutionary biology (including, e.g., Elliott Sober and Peter Godfrey-Smith). Dick's politics—leftist, radical, egalitarian, Marxist—remain an essential part of his approach to science and to the world at large. His politics influenced, for example, his sustained criticism of biological determinism and of biological arguments supporting racism and similar ideologies. In an enduring collaboration with Richard Levins, another truly original and creative scientist, he explored duality in the nature of science itself, on the one hand the "generic development of human knowledge" while at the same time the "increasingly commodified product of a capitalist knowledge industry" (*Biology under the Influence: Dialectical Essays on Ecology, Agriculture and Health*, 2007, Monthly Review Press, New York).

Richard Lewontin is a deep, critical thinker and an illuminating writer. His works inspire us to examine how we think about biology and challenge us to do better science. His lab at the University of Chicago and then at Harvard over the decades has been a true incubator of deep quantitative thinking about evolution, a spawning ground for many of the great minds of demography, evolution, ecology, and genetics over the last 5 decades. His challenge to biology in the twenty-first century continues with another book. This elegantly short and very accessible book emphasizes and synthesizes the importance of stochasticity in timing of biological processes at different levels from genes, molecular biology, ontogeny, ecology, and evolution. Once again, we have a book from Dick that should be required reading, but this time not only by ecologists, evolutionary biologists, and population geneticists, but also by molecular, cell, and developmental biologists (*The Triple Helix: Gene, Organism and Environment*, 2000, Harvard University Press, Cambridge, MA). In its breadth, it is perhaps the work by Lewontin with the potential to most fundamentally conceptually unify the biological sciences, sensu latu.

Carol C. Horvitz and **Shripad Tuljapurkar**,
on behalf of the ASN Executive Committee