

- Welcome to DySoC/NIMBioS webinars on cultural evolution!



- Sergey Gavrilets

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- Professor of Mathematics
- Director of the Center for the Dynamics of Social Complexity (DySoC)
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National Institute for Mathematical and Biological Synthesis

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Updates and Information on Coronavirus (COVID-19)

Due to the evolving coronavirus situation, NIMBioS activities through December 31 are expected to be virtual, with limited exceptions. [Read more »](#)

New Opportunities at NIMBioS: NIMBioS Interactive – a Virtual Collaborative Space for the NIMBioS Community. [Read more »](#)



Welcome to NIMBioS!

Established in 2008 with an award from the National Science Foundation, the National Institute for Mathematical and Biological Synthesis brings together researchers from around the world to collaborate across disciplinary boundaries to find creative solutions to today's complex biological problems. The NIMBioS process and its results have united the forces of diverse academic communities, transforming the landscape of scientific research and education. [Read more »](#)

“

This truly was one of the best interdisciplinary workshops on sustainability that I have been to.

”

Eli Fenichel, Forestry and Environmental Studies, Yale University, on the DySoC/NIMBioS Investigative Workshop
[Extending the Theory of Sustainability](#)

FEATURED PUBLICATION



Newt Distancing? New experimental work and corresponding disease models published in *Scientific Reports* show that increasing habitat complexity in populations of eastern newts

FEATURED VIDEO

Cultural Evolution – Learn Online. To truly understand how culture evolves, scientists often turn to mathematical models to



FAKE NEWS! The Science Faculty Clerk



Center for the Dynamics of Social Complexity



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Center for the Dynamics of Social Complexity (DySoC)

DySoC promotes transdisciplinary research into the origins, evolution, and futures of human social complexity. We study human behaviors and social interactions that underlie past and present societies in the pursuit of transformative discovery. Through theory, data, and synthesis, we help realize evidence-based innovations to address grand challenges of our time.

We pursue our mission through distinctive evolutionary and quantitative approaches. Considering human cognition, culture, and societies as evolved – and evolving – phenomena opens new frontiers in the exploration of human psychology, behavior, and social organization. It also gives fresh insight into the diverse world around us. Drawing comparisons between humans and other biological organisms or between past and present societies can reveal parallels that promote greater understanding of general principles, which in turn can reframe understanding of cooperation and conflict in contemporary societies. Use of mathematical models enables us to delve further into biological, cultural, and social evolution to explore foundational and new ideas. This can not only increase predictive capacity, it can also afford invaluable opportunities to train our intuition and interpretation of social complexity.

Recent Publication

Daxecker U, Prins BC. 2017. Financing rebellion: Using piracy to explain and predict conflict intensity in Africa and Southeast Asia. *Journal of Peace Research* 54(2):215-30. [\[Online\]](#) Using inferential statistics and predictive assessments, evidence from conflicts in coastal African and Southeast Asian states from 1993 to 2010 shows that maritime piracy increases conflict intensity, and that the inclusion of dynamic factors helps improve the predictive performance of empirical models of conflict events in in-sample and out-of-sample forecasts. [View more DySoC-related publications »](#)

Recent Project

Gavrilets S – High-performance computing for agent-based modeling of between-group conflicts. Office of the Naval Research (2017-2018)
The requested computational equipment will greatly enhance the quality and efficiency of the PI's research on complex social behaviors by allowing much faster and wider numerical exploration of mathematical models which in turn will lead to better understanding of complex social phenomena and more precise predictions. [View more DySoC-related projects »](#)

Announcements

Read the latest DySoC Newsletter: September 2020

DySoC/NIMBioS Cultural Evolution Webinars. DySoC and NIMBioS are happy to announce a series of free webinars on cultural evolution. Speakers include lead designers of five online learning modules that are available on the DySoC website. [Read more and register for the series »](#)

Next: Tuesday 11:45 a.m. EDT, Sep 29

Speaker: Peter J. Richerson, University of California, Davis

Topic: *Outreach for the Cultural Evolution Society: Everybody needs to know a little bit about cultural evolution*



Online Learning Modules Released

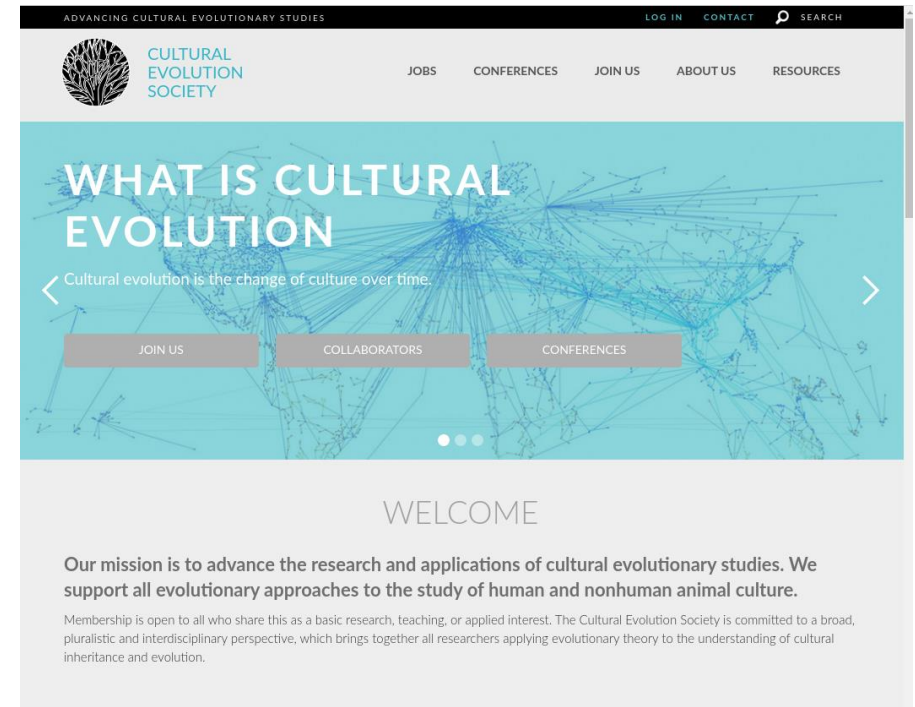
[DySoC and the Cultural Evolution Society \(CES\)](#)

2008-present; >8,500 visitors; [nimbios.org](#)

2018-present; [dysoc.org](#)

Webinar series

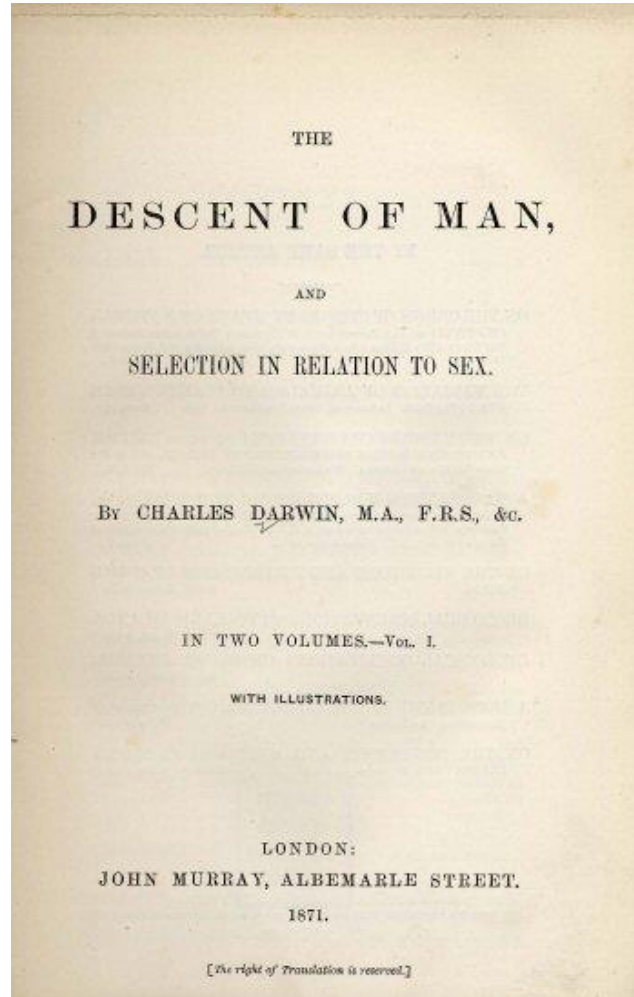
- Online teaching modules on the dynamic models of cultural evolution
- Output of a grant funded by the **John Templeton Foundation** to promote the **Cultural Evolution Society**



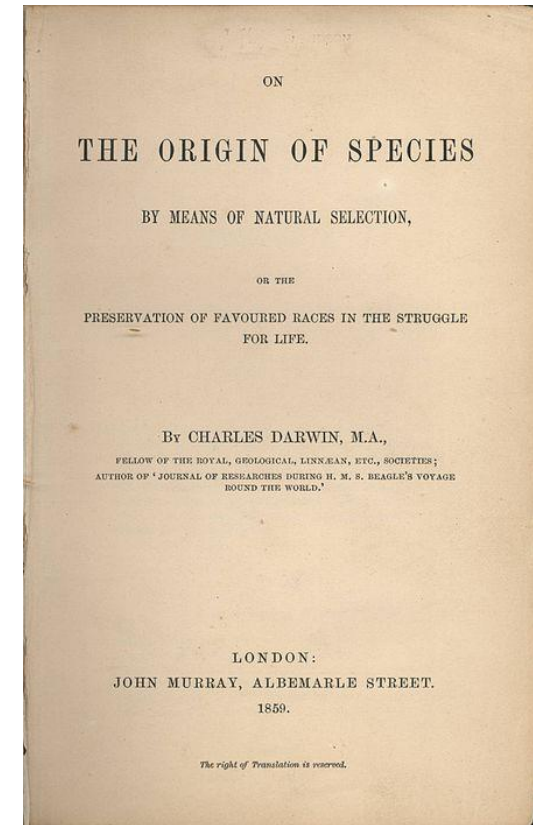
Schedule

- Sept. 29: Peter J. Richerson (UC Davis)
- Oct. 6: Paul Smaldino (UC Merced)
- Oct. 13: Andy Whiten (University of St Andrews, UK)
- Oct. 20: Joe Stubbersfield (Heriot-Watt University, UK) and Erik Gjesfjeld (Cambridge)
- Oct. 27: Adrian Bell (Utah)
- Nov. 3: Bernie Koch (UCLA)
- Nov.10: Peter Turchin (Complexity Science Hub Vienna)
 - *Clodynamics: The Journal of Quantitative History and Cultural Evolution*
- Nov.17: Ruth Mace (UCL)
 - *Evolutionary Human Sciences*
- Nov.24: Patricia Izar (University of Sao Paulo, Brazil)

24 February 1871



Charles Darwin



1859

Three important insights of the *Descent*

- Humans, like every other species, are a “modified descendant of some pre-existing form”.



- Culture and cultural evolution were particularly important in human evolution
 - the evolution in civilized societies “depends to a subordinate degree on natural selection The more efficient causes of progress seem to consist of a good education during youth while the brain is impressible and of a high standard of excellence, inculcated by the best and ablest men, embodied in the laws, customs, and traditions of the nation, and enforced by public opinion.”
 - "The expression of the wishes and judgment of the members of the same community ... serves ... as a most important secondary guide of conduct, in aid of the social instincts, but sometimes in opposition to them"

- Cooperation

- "A tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to aid one another, and to sacrifice themselves for the common good, would be victorious over most other tribes..."

Pyotr Alexeyevich Kropotkin (1842-1921)

- Russian anarchist, socialist, economist, historian, geographer, and philosopher
- “Mutual Aid: a Factor in Evolution” (1902)
 - cooperation and mutual aid are one of the mechanisms of adaptation and increased survival common across all branches of life.



MUTUAL AID

A FACTOR OF EVOLUTION

BY
P. KROPOTKIN

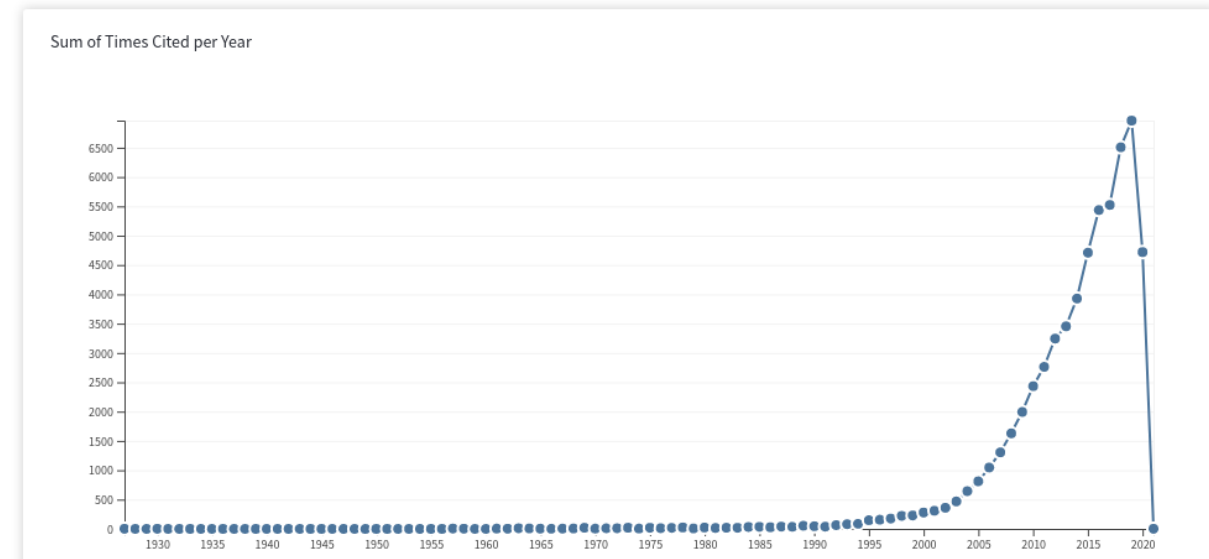
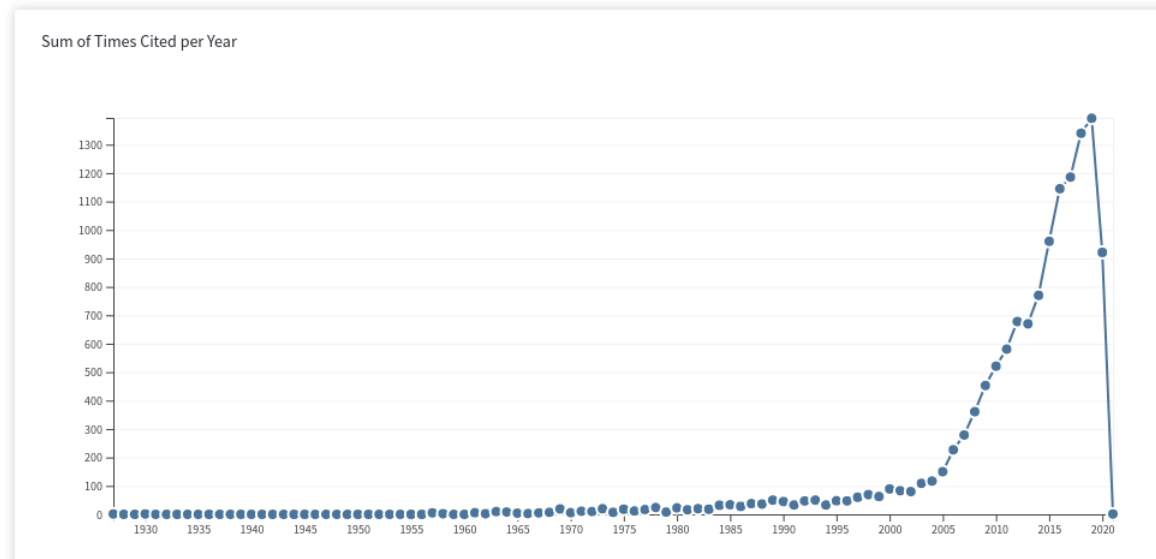
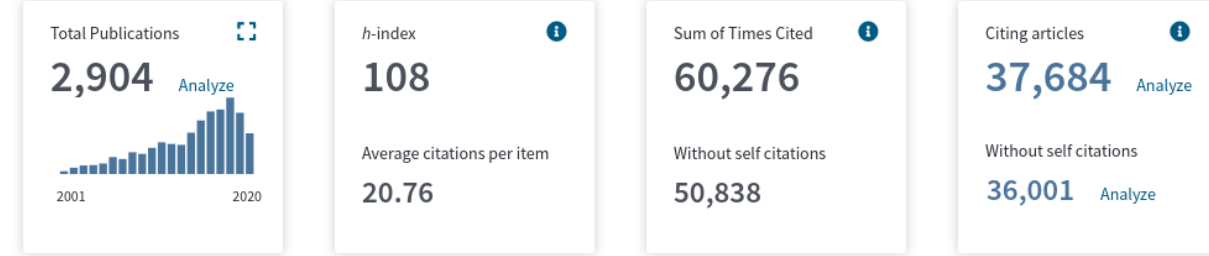
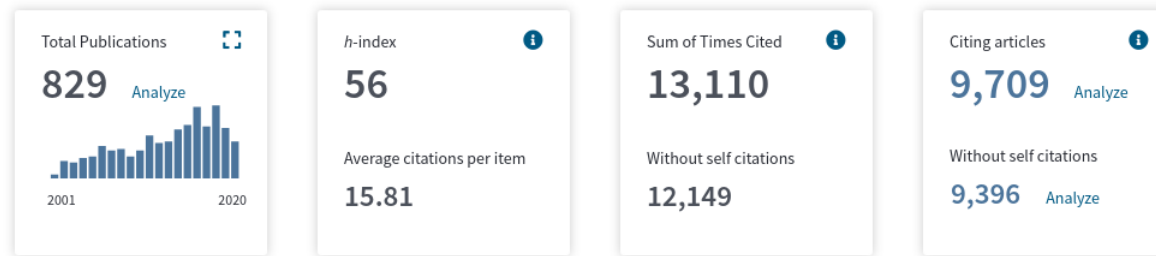
NEW YORK
McCLURE PHILLIPS & Co.,
1901

Biological evolution and cultural evolution: variation, selection, inheritance

- **Evolutionary biology:** a mature science for at least 100 years
 - R. A. Fisher “The Genetical Theory of Natural Selection” (1930)
 - T. Dobzhansky “Genetics and the Origin of Species” (1937)
 - E. Mayr “Systematics and the Origin of Species” (1942)
 - *Modern Synthesis* of 1930s-1940s
 - Society for the Study of Evolution (1946)
 - *Evolution: International Journal of Organic Evolution* (1946)
 - Departments of ecology & evolutionary biology in most major universities

Biological evolution and cultural evolution: variation, selection, inheritance

- **Cultural evolution:** an explosive growth started only 20 years ago



Cultural evolution

- Applications to biology, anthropology, psychology, economics, political science, law, sociology, and history
- Most urgent problems our society faces



- Cultural Evolution Society (2016)

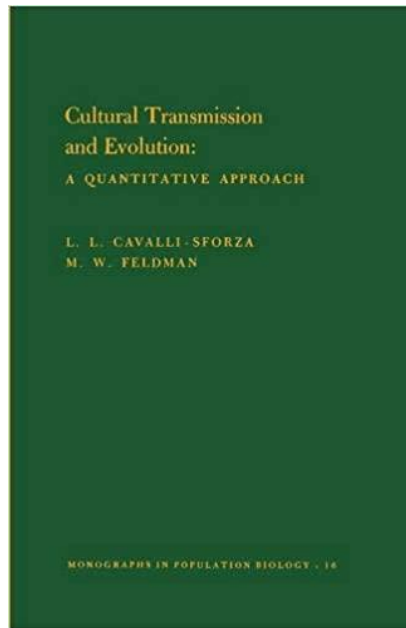
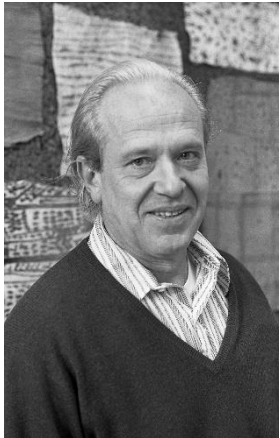


First attempt (unsuccessful): Nicolai Rashevsky (1899-1972)

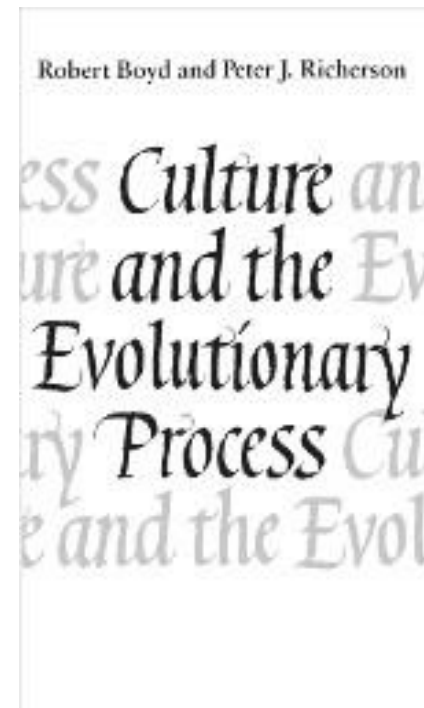


- Pioneer of mathematical/theoretical biology and mathematical biophysics
- Committee for Mathematical Biology at University of Chicago
- *Bulletin of Mathematical Biology* (1931-
- *Society for Mathematical Biology* (1972)
- Models of imitative behavior: 1940s-1950s
- Pioneer of mathematical modeling of social and cultural evolution
 - “Mathematical theory of human relations” (1947)
 - “Mathematical biology of social behavior” (1950)
 - “Looking at history through mathematics” (1968)
- “Problems of history may still turn out to be as inspirational to mathematicians, as problems of physics have been, and as problems of biology are bound to become.” Nicolas Rashevsky (1954)

40 years later: the dawn of the science of cultural evolution



1981

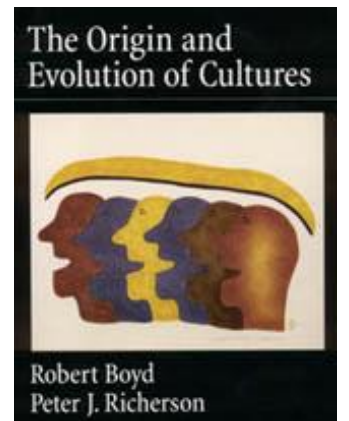


1985



Peter J. Richerson

- B.S. in Entomology, UC Davis (1965)
- Ph.D. in Zoology (1969)
- Professor of Environmental Studies at UC Davis (1977-
- Hundreds of papers
 - “Cultural group selection plays an essential role in explaining human cooperation: A sketch of the evidence” BEHAVIORAL AND BRAIN SCIENCES (2016)
- Dozens of students
- First President of the *Cultural Evolution Society*



not by
genes alone



edited by
Peter J. Richerson and
Robert H. Boyd



STRATEGIC FORM REPORT