

Matthew R. Zefferman, PhD

Department of Defense Analysis
Naval Postgraduate School

mrzeffer@nps.edu
zefferman.com

EDUCATION

- Ph.D. Ecology (human ecology emphasis), University of California, Davis, 2013
M.P.S. Environmental Management, Cornell University, 2002
B.S. Biological & Environmental Engineering, *cum laude*, Cornell University, 2001

ACADEMIC EMPLOYMENT

- 2019– Naval Postgraduate School
Assistant Professor, Department of Defense Analysis
- 2017–19 Naval Postgraduate School Foundation
Donald R. Beall Defense Fellow
- 2015–17 Arizona State University
Postdoctoral Fellow, Institute of Human Origins
- 2013–15 National Institute for Mathematical and Biological Synthesis
NSF Postdoctoral Research Fellow

PROFESSIONAL EMPLOYMENT

- 2002–07 Civil Engineering Officer, U.S. Air Force
2006–07 Chief of Construction Planning and Design, Bagram Air Field, Afghanistan
2004–06 Readiness Flight Commander, Eielson AFB, Alaska
2003–04 Environmental Engineering Officer, Dyess AFB, Texas
2003 Project Engineering Officer, Al Dhafra Air Base, United Arab Emirates
2002–03 Construction Planning Engineer, Dyess AFB, Texas
- 2000 Lawrence Livermore National Laboratory
Student Researcher, Health and Ecological Assessment Division

PUBLICATIONS

Journal Articles

- 2023 Zefferman, M. Constraints on cooperation shape hierarchical vs distributed structure in human groups. *Scientific Reports*, 13, 1160. doi:10.1038/s41598-022-23454-9
- 2021 Zefferman, M. and S. Mathew. Combat stress in a small-scale society suggests divergent evolutionary roots for posttraumatic stress disorder symptoms. *Proceedings of the National Academy of Sciences*, 118 (15), e2020430118. doi:10.1073/pnas.2020430118

- 2020 Zefferman, M. and S. Mathew. An evolutionary theory of moral injury with insight from Turkana warriors. *Evolution & Human Behavior*, 41 (5), 341–353. doi:10.1016/j.evolhumbehav.2020.07.003
- 2018 Zefferman, M. Cultural multilevel selection suggests neither large or small cooperative agreements are likely to solve climate change without changing the game. *Sustainability Science*, 13 (1), 109–118. doi:10.1007/s11625-017-0488-3
- 2016 Zefferman, M. Mothers teach daughters because daughters teach granddaughters: evolution of sex-biased transmission. *Behavioral Ecology*, 27 (4), 1172–1181. doi:10.1093/beheco/arw022
- 2016 Richerson P., R. Baldini, A. Bell, K. Demps, K. Frost, V. Hillis, S. Mathew, E. Newton, L. Newson, C. Ross, P. Smaldino, T. Waring, and M. Zefferman. Cultural group selection plays an essential role in explaining human cooperation: a sketch of the evidence. *Behavioral and Brain Sciences*, 39, e30–49. doi:10.1017/S0140525X1400106X
- 2015 Zefferman, M. and S. Mathew. An evolutionary theory of large-scale human warfare: group-structured cultural selection. *Evolutionary Anthropology*, 24 (2), 50–61. doi:10.1002/evan.21439
- 2014 Zefferman, M. Direct reciprocity under uncertainty does not explain one-shot cooperation, but demonstrates the benefits of a norm psychology. *Evolution & Human Behavior*, 35 (5), 358–367. doi:10.1016/j.evolhumbehav.2014.04.003
- 2003 Olabi, A., J. Hunter, P. Jackson, M. Segal, R. Spies, C. Wang, C. Lau, C. Ong, C. Alexander, E. Raskob, J. Plichta, O. Zeira, R. Rivera, S. Wang, B. Pottle, C. Leung, C. Vicens, C. Tao, C. Beers, G. Fung, J. Levine, J. Yoo, J. Jackson, K. Saikonen, M. Zimmerman, M. Cunningham, M. Crum, N. Ishman, N. Voo, R. Cadena, R. Relinger, S. Wada. Work measurement for estimating food preparation time of a bioregenerative diet. *Habitation*, 9 (1–2), 17–30. doi:10.3727/1542966034605252
- 2002 Pimentel, D., M. Herz, M. Glickstein, M. Zimmerman, R. Allen, K. Becker, J. Evans, B. Hussain, R. Sarsfeld, A. Grosfeld, and T. Seidel. Renewable energy: current and potential issues. *BioScience*, 52 (12), 1111–1120. doi:10.1641/0006-3568(2002)05

Journal Commentaries, Letters, and Responses

- 2020 Zefferman, M. and P. Smaldino. Integrating models of cognition and culture will require a bit more math. *Behavioral and Brain Sciences*, 34, e119. doi:10.1017/S0140525X1900267X
- 2016 Richerson P., R. Baldini, A. Bell, K. Demps, K. Frost, V. Hillis, S. Mathew, E. Newton, L. Newson, C. Ross, P. Smaldino, T. Waring, and M. Zefferman. Cultural group selection follows Darwin’s classic syllogism for the operation of selection. *Behavioral and Brain Sciences*, 39, e58. doi:10.1017/S0140525X15000606
- 2015 Zefferman, M., R. Baldini and S. Mathew. Solving the puzzle of human warfare requires an explanation of battle raids and cultural institutions. *Proceedings of the National Academy of Sciences*, 112 (20), E2557. doi:10.1073/pnas.1504458112
- 2014 Zefferman, M. When repentance and forgiveness are possible, direct reciprocity does not explain one-shot generosity, even under arbitrarily high levels of uncertainty. *Evolution & Human Behavior*, 35 (6), 548–549. doi:10.1016/j.evolhumbehav.2014.07.003
- 2014 Zefferman, M. and P. Richerson. Many important group-level traits are institutions. *Behavioral and Brain Sciences*, 37 (3), 280–281. doi:10.1017/S0140525X13003087
- 2013 Zefferman, M. Should the consensus be essentialist and adaptationist? a commentary on David

Sloan Wilson *Cliodynamics*, 4 (1), 120–122. doi:10.21237/C7cli04119066

Book Chapters

- 2012 Zimmerman, M., R. McElreath, and P. Richerson. The Evolution of Cooperation. In: *Encyclopedia of Theoretical Ecology* (pp. 111–120), edited by A. Hastings and L. Gross. University of California Press. doi:10.1525/9780520951785
- 2007 Pimentel, D., M. Herz, M. Glickstein, M. Zimmerman, R. Allen, K. Becker, J. Evans, B. Hussain, R. Sarsfeld, A. Grosfeld, and T. Seidel. Renewable energy: current and potential issues. In: *Food, Energy, and Society*, 3rd ed. (pp. 259–276), edited by D. Pimentel and M. Pimentel. CRC Press. doi:10.1201/9781420046687

Conference Proceedings

- 2020 Cape, M., S. Hall, A. Baylouny, M. Zefferman, S. Aros, J. Donahue, H. Lee, and N. Sleevi. Population Migration Decision-Making. *I/ITSEC (Interservice/Industry Training, Simulation, and Education Conference)*.

INVITED TALKS

- 2022 A New Synthesis for the Science of Science Workshop, Santa Fe Institute, NM
- 2020 Evolutionary Psychiatry Webinar Series, Section of Evolutionary Psychiatry, World Psychiatric Association
- 2020 Club EvMed Virtual Evolutionary Medicine Conversation, International Society for Evolution, Medicine and Public Health
- 2019 Role of Information in Complex Conflict Working Group, Santa Fe Institute, NM
- 2018 Behavior, Evolution, and Culture Seminar, Department of Anthropology, University of California, Los Angeles
- 2018 Mind, Technology, and Society Seminar, Department of Cognitive Science, University of California, Merced
- 2016 Interdisciplinary Perspectives on Modelling Conflict Workshop, University of Essex, UK
- 2015 Ecology and Evolutionary Biology Seminar, Department of Ecology & Evolutionary Biology, University of Tennessee, Knoxville
- 2013 Modeling the Dynamics of Norms and Culture Conference, Center for the Study of Complex Systems, University of Michigan
- 2012 Investigative Workshop on Modeling Social Complexity, National Institute of Mathematical and Biological Synthesis, TN
- 2009 Santa Fe Institute Workshop on Frontiers in Complex Systems, Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing

CONFERENCE ACTIVITY

Conferences and Workshops Organized

- 2018 PTSD in Evolutionary and Cross-cultural Perspectives Workshop, Arizona State University

- 2013–15 Evolutionary Origins of Complex Institutions Working Group, NIMBioS
2013 Evolutionary Approaches to Peace Science Workshop, Peace Science Society Workshop

Conference Presentations

- 2021 Cultural Evolution Society Meeting (virtual)
2021 International Society for Evolutionary Medicine and Public Health Conference (virtual)
2019 Santa Fe Institute Graduate Workshop on Complex Social Systems Alumni Conference, NM
2018 California Workshop on Evolutionary Social Science, University of California, Santa Barbara
2018 Cultural Evolution Society Meeting, Tempe, AZ
2018 PTSD in Evolutionary and Cross-cultural Perspectives Workshop, Arizona State University
2018 International Society for Evolutionary Medicine and Public Health Conference, Park City, UT
2017 Cultural Evolution Society Inaugural Meeting, Max Planck Institute for the Science of Human History, Germany
2017 Human Behavior and Evolution Society Annual Meeting, Boise, ID
2016 American Anthropological Association Annual Meeting, Minneapolis, MN
2016 Human Behavior and Evolution Society Annual Meeting, Vancouver, BC
2014 Ecological Society of America Annual Meeting, Sacramento, CA
2014 International Society for Research on Aggression World Meeting, Atlanta, CA
2013 Peace Science Society Annual Meeting, Knoxville, TN
2013 Political Networks Conference, University of Indiana, Bloomington
2011 Game Theory and Society Conference, ETH Zurich, Switzerland
2011 Midwest Political Science Association Conference, Chicago, IL
2010 Midwest Political Science Association Conference, Chicago, IL

Posters Presented

- 2019 NetSci Conference, University of Vermont, Burlington
2017 STRONG STAR Combat PTSD Conference, San Antonio, TX
2014 Mathematics of Social Learning Workshop, Institute for Pure and Applied Mathematics, University of California, Los Angeles
2011 Human Behavior and Evolution Society Annual Meeting, Montpelier, France
2011 Institute on Bounded Rationality, Max Plank Institute for Human Development, Berlin
2009 Evolution of Human Aggression Conference, University of Utah, Salt Lake City

SPONSORED RESEARCH

- 2022–23 Regional Defense Fellowship Program Strategic Exercise Development (\$1.3M)

ACADEMIC AWARDS AND FUNDING

- 2021 Teaching and Learning Center Education Grant, Naval Postgraduate School (\$15K)
- 2015–17 Donald R. Beall Defense Fellowship (>\$140K)
- 2016–17 ASU Center for Evolution and Medicine Seed Grant (\$40K)
- 2013–15 NIMBioS/NSF Postdoctoral Research Fellowship (>\$120K)
- 2007–12 UC Davis Block Grant Fellowships (5 awards) (>\$50K)
- 2008–13 Post-9/11 GI Bill (>\$120K)
- 2010–11 Professors for the Future Graduate Fellowship, UC Davis (\$3K)

COURSES TAUGHT

Primary Instructor, Graduate Level

- Modeling for Special Operations II (statistics), Naval Postgraduate School
- Models of Conflict, Naval Postgraduate School
- Game Theory for Defense Analysis, Naval Postgraduate School
- Quantitative Decision-Making, Naval Postgraduate School
- Mathematical Biology Graduate Seminar, University of Tennessee, Knoxville

Primary Instructor, Undergraduate Level

- Terrorism and War, University of California, Davis (as Chancellor's Teaching Fellow)

Teaching Assistant, Undergraduate Level

- Principles of Policy Evaluation, University of California, Davis
- Environmental Economics, University of California, Davis
- Environmental Analysis, University of California, Davis
- Principles of Ecology and Evolution, University of California, Davis
- Engineering Applications in Biological Systems, Cornell University
- Environmental Systems Analysis, Cornell University
- Explorations in Engineering, Cornell University
- Introduction to MATLAB Programming, Cornell University

Undergraduate Student Mentoring

- 2014 Summer Research Experience Mentor, NIMBioS
- 2011–13 Career Discovery Group Mentor, UC Davis

TEACHING AWARDS AND FELLOWSHIPS

- 2009–10 Chancellor's Teaching Fellowship, University of California, Davis

2000 Undergraduate Teaching Assistant of the Year, Department of Biological and Environmental Engineering, Cornell University

ACADEMIC SERVICE

University Service

2011–12 Academic Senate Committee to Investigate 18 Nov, University of California, Davis

2001–02 University-ROTC Relations Committee, Cornell University

Departmental Service

2019– Academic Associate for Instruction, Defense Analysis, Naval Postgraduate School

2010–12 Executive Committee, Graduate Group in Ecology, University of California, Davis

2008–11 Admissions Committee, Graduate Group in Ecology, University of California, Davis

2008–09 Chair, Ecology Graduate Student Association, University of California, Davis

2000–01 Curriculum Committee, Biological and Environmental Engineering, Cornell University

Elected Service

2018– Elected to Marina Coast Water District Board of Directors

Academic Journal Peer Review

American Political Science Review

Behavioral and Brain Sciences

Behavioral Ecology and Sociobiology

Biological Processes

Current Anthropology

Evolution & Human Behavior

Evolutionary Anthropology

Evolutionary Human Sciences

Frontiers in Psychology

Human Nature

Journal of Artificial Societies & Social Simulation

Journal of Personality and Social Psychology

Journal of Statistical Physics

Journal of Theoretical Biology

Nature Communications

Philosophical Transactions of the Royal Society B

PLOS ONE

Proceedings of the Royal Society B

Politics and the Life Sciences

Sustainability Science

Thesis Committees

- 2020 Wieser, A. *Teaching Innovation: Designing a Curriculum to Change the Military*.
- 2020 Sirois, B. and K. Chestnut. *The Boomerang Soldier: Does Recruitment of Former SOF Officers and Enlisted Require Revision?*
- 2019 McCarey, E. *Practical Tools for Your Moral Toolkit: A Leadership Guide to Group Ethical Behavior*.
- 2019 Donohue, T. *A Game of Economic Power and Influence: The People's Republic of China and the Belt and Road Initiative*.
- 2018 Rader, S., M. Nelson, and M. Gorgas. *Attention Deficit Hyperactivity Disorder (ADHD) and the US Army: Recruiting and Readiness Implications*.

Dissertation Committees

- 2021 – Michael Baumgarten, School of Human Evolution and Social Change, Arizona State University (external committee member)

ADVANCED TRAINING

- 2013 Advanced Computational Social Science Modeling Workshop, Santa Fe Institute, NM
- 2011 Summer Institute on Bounded Rationality, Max Plank Institute for Human Development, Berlin
- 2010 Empirical Implications of Theoretical Models (EITM) Summer Institute, UC Berkeley
- 2009 Computational Social Science Modeling Graduate Workshop, Santa Fe Institute
- 2008 Santa Fe Institute COMplex Systems Summer School, Beijing, China

PROFESSIONAL ORGANIZATIONS

Cultural Evolution Society (founding member)

OTHER ACADEMIC AWARDS AND RECOGNITION

- 2018 Santa Fe Institute/DARPA National Security Studio Workshop Invited Participant, Santa Fe Institute
- 2009 Institute on Global Conflict and Cooperation Fellow, UC Santa Barbara
- 2009 NSF Graduate Research Fellowship in Integrative Social Science honorable mention

CREDENTIALS

U.S. Department of Defense secret clearance

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