The Vanishing Point

Where Systems of Caring Emerge

Professor Daniel B. Oerther, PhD, PE, FAAN
MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY Rolla, MO 65409, USA

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Working outline with selected professional chronologies and references

“Habitus Chronology” identifies selected recognitions, experiences, and responsibilities that are relevant to professional formation, and will be explored to support each chapter

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Introduction

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From London to Tempe and beyond

The Great Sanitary Awakening

Environmental Biotechnology and Microbial Ecology

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Habitus Chronology

1995, BA in Biological Sciences, Northwestern University

1995, BS in Environmental Engineering, Northwestern University

1998, MS in Environmental Engineering, University of Illinois, Urbana-Champaign

2002, PhD in Environmental Engineering, University of Illinois, Urbana-Champaign

2003, NSF-supported Environmental Biotechnology and Microbial Ecology workshop in Rabat, Morocco

2003, selected to participate in the Microbial Diversity Course at the Marine Biological Laboratory in Woods Hole, Massachusetts

2003, NSF CAREER Award

2005, Fulbright Scholar to India

2005, selected to attend National Academies Keck Future Initiative, “The Genomics Revolution: Implications for Treatment and Control of Infectious Disease”

2006, NIEHS R01 Award, “Bacterial Diversity as a BioMarker of Soil Health”

2010, appointed John A. and Susan Mathes Endowed Chair of Civil Engineering, Missouri University of Science and Technology

2014, Excellence in Environmental Engineering and Science Education Award, American Academy of Environmental Engineers and Scientists and the Association of Environmental Engineering and Science Professors

References

Logan, et al, 1998, Environmental Engineering Research Frontiers: Final Report of the NSF/AEEP Workshop held on January 14-16, 1998, 14 pages

Oerther et al, 2001, Quantifying Filamentous Bacteria in Activated Sludge Before, During, and After an Incident of Foaming by Oligonucleotide Probe Hybridizations and Antibody Staining, https://doi.org/10.1016/S0043-1354(01)00057-4

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Saikaly and Oerther, 2011, Diversity of Dominant Bacterial Taxa in Activated Sludge Promotes Functional Resistance Following Toxic Shock Loading, https://doi.org/10.1007/s00248-010-9783-6

Lamendella et al, 2011, Comparative Fecal Metagenomics Unveils Unique Functional Capacity of the Swine Gut, https://doi.org/10.1186/1471-2180-11-103

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Voth-Gaeddert et al, 2019, Aflatoxin Exposure, Child Stunting, and Dysbiosis in the Intestinal Microbiome Among Children in Guatemala, https://doi.org/10.1089/ees.2019.0104

Vaishali and Boopathy, 2024, Edwin Chadwick: A Pioneer of Public Health Reform and His Role in Sanitary Awakening, https://doi.org/10.7759/cureus.68858

Humanitarian technology

Global Research in Water, Sanitation, and Hygiene to Eliminate Childhood Stunting (GRoWES)

PulaCloud

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Habitus Chronology

2006, Graduate studies in Public Health at The Johns Hopkins University

2015, Steven K. Dentel Award for Global Outreach, Association of Environmental Engineering and Science Professors

2016, Superior Achievement Award for Improved Drinking Water in Ixcan, Guatemala from the annual Excellence in Environmental Engineering and Science Competition, American Academy of Environmental Engineers and Scientists

2017, Frederick George Pohland Medal, Environmental Engineering and Science Foundation and the Association of Environmental Engineering and Science Professors

2018, Dr. John L. Leal Award, American Water Works Association

2018, Best Innovative Environmental Health Solution Award, Chartered Institute of Environmental Health

2019, Lillian Wald Humanitarian Award, National League for Nursing

2020, elected to Board of Directors of Engineers Without Borders-USA

References

Divelbiss et al, 2013, Environmental Health and Household Demographics Impacting Biosand Filter Maintenance and Diarrhea in Guatemala: An Application of Structural Equation Modeling, https://doi.org/10.1021/es303624a

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Oerther and Oerther, 2022, Improving Interprofessional Environmental Health Education Using the Leave No One Behind Framework, https://doi.org/10.2105/AJPH.2022.306832

Oerther et al, 2024, The Urgent Need for Interprofessional Environmental Health Education to Achieve Universal Health Coverage, Even in Disasters, https://doi.org/10.1021/acs.estlett.4c00756

A parallel story (guest piece)

Engineers Without Borders

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Environmental Engineering 3.0

Who pays for caring? The care penalty and the problem of scale

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Habitus Chronology

2004, PE license, State of Ohio

2005, Board Certified Environmental Engineer in Water Supply and Wastewater, American Academy of Environmental Engineers and Scientists

2020, Fellow of the Association of Environmental Engineering and Science Professors

2022, President, American Academy of Environmental Engineers and Scientists

2022-2026, Executive Director, American Academy of Environmental Engineers and Scientists

2024-2026, President, Council of Engineering and Scientific Specialty Boards

References

Logan et al, 1998, Environmental Engineering Research Frontiers: Final Report of the NSF/AEEP Workshop held on January 14-16, 1998, 14 pages

Rittmann et al, 2006, A Vista for Microbial Ecology and Environmental Biotechnology, https://doi.org/10.1021/es062631k

2019, Environmental Engineering for the 21st Century: Addressing Grand Challenges, National Academies of Sciences, Engineering, and Medicine

Oerther et al, 2021, The Academy, the Association, and the Society Advancing Environmental Engineering Training and Credentialing, https://doi.org/10.1089/ees.2021.0347

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Oerther et al, 2024, Environmental Engineering 3.0: Faced with Planetary Problems, Solutions Must Scale-up Caring, https://doi.org/10.1061/JOEEDU.EEENG-7764

2025, Environmental Engineering Body of Knowledge (EEBoK2), Second Edition, American Academy of Environmental Engineers and Scientists

The Nurse+Engineer – where tech meets care

The first joint degree program (BSN+BSBME) inaugurated at Duquesne University

The Elaine Marieb Center for Nursing and Engineering Innovation at UMass Amherst

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Habitus Chronology

2011, inducted as lifetime Honorary Member of Sigma Theta Tau the International Honor Society

2013, appointed Board of Directors, Sigma Nursing Building Corporation

2015, invited participant National Academies Keck Futures Initiative, "Art and Science, Engineering, and Medicine Frontier Collaboration: Ideation, Translation, and Realization"

2016, inducted as lifetime Honorary Fellow of the American Academy of Nursing

2018, inducted as lifetime Honorary Academy of Nursing Education Fellow of the National League for Nursing

2023, Edith Moore Copeland Founder's Award, Sigma Theta Tau the International Honor Society of Nursing

2023, appointed Professor of Nursing (by courtesy), Duquesne University

2024, Champion of Nursing Award, American Nurses Association

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Locsin, 2005, Technological Competency as Caring in Nursing: A Model for Practice

Oerther, 2017, Using Nursing Theory to Improve the Teaching of Engineering Practice, https://doi.org/10.18260/1-2--29084

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Oerther and Oerther, 2022, Comparing Oranges Versus Grapes as a Metaphor of the Nurse+Engineer, https://doi.org/10.1111/jocn.16209

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Young-Brice and Oerther, 2026, When Nurses and Engineers Use the Same Words, Do We Mean the Same Things? *forthcoming*

I was there (eyewitness piece)

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Science Diplomacy

Caribbean Ocean and Aquaculture Sustainability faciliTy (COAST)

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Habitus Chronology

2012, Graduate studies in Public Administration at the Indiana University, Bloomington

2012, Fulbright Distinguished Chair to Brazil

2014, selected for Jefferson Science Fellowship, National Academies of Sciences, Engineering, and Medicine

2014-2016, Senior Science Advisor, Secretary's Office of Global Food Security, Washington, DC

2014-2021, Foreign Affairs Officer, United States Department of State

2017-2019, COAST Project Implementation Coordinator, CCRIF SPC

2019, Fulbright Scholar to the United Kingdom

2026, Peace Corps Virtual Service Program Volunteer to the Philippines

References

2010, New Frontiers in Science Diplomacy, Royal Society and AAAS

2015, Diplomacy for the 21st Century: Embedding a Culture of Science and Technology Throughout the Department of State, National Academies of Sciences, Engineering, and Medicine

Oerther, 2016, From Disaster to Development: Finance Provides a Platform to Empower Technology for Resilience to Climate Change, https://doi.org/10.1016/j.proeng.2016.08.173

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COVID-19, https://www.sciencediplomacy.org/letter-field/2020/using-science-in-diplomacy-develop-coast

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Oerther and Oerther, 2023, Sustainable Development in the Anthropocene Requires Interprofessional Environmental Health as Science Diplomacy, https://doi.org/10.1109/GHTC56179.2023.10354712

The Two Termini

Planetary Health

Engineering for One Planet

Planetary Health Alliance

Human Flourishing

Thriving

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Habitus Chronology

2023, Chair of the Board of Trustees, Chartered Institute of Environmental Health, London

2023, Diplomate Laureate, American Academy of Sanitarians

2024-2026, Climate and Health Technical Advisor to the Board of Directors, National Environmental Health Association

2025, Distinguished Public Policy Fellow, Inaugural member of the Public Health Academy, National Academies of Practice

References

Whitmee et al., 2015, Safeguarding Human Health in the Anthropocene Epoch: Report of the Rockefeller Foundation-Lancet Commission on Planetary Health, https://doi.org/10.1016/s0140-6736(15)60901-1

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From I- and T- to V-shaped Professionals

Consilience

Convergence

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Habitus Chronology

2011, invited participant National Academy of Engineering Frontiers of Engineering Education Symposium

2024, Duncan Fraser Global Award for Excellence in Engineering Education, International Federation of Engineering Education Societies

2025, appointed to Education for Thriving in a Changing Climate consensus study of the National Academies of Sciences, Engineering, and Medicine

References

Benner, 1984, From Novice to Expert: Excellence and Power in Clinical Nursing Practice

Boyer, 1990, Scholarship Reconsidered: Priorities of the Professoriate

Oerther and Oerther, 2018, Pierre Bourdieu's Theory of Practice Offers Nurses a Framework to Uncover Embodied Knowledge of Patients Living With Disabilities or Illnesses: A Discussion Paper, https://doi.org/10.1111/jan.13486

Oerther et al, 2020, Identifying Opportunities for Educators to Pursue Collaboration at the Interface of Nursing and Engineering – And a Word of Caution, https://doi.org/10.1111/jan.14291

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Ethical Stewardship

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2026, Curriculum Transformation Grant: We CArE About AI, Ignition Grants for Sustainable Education Transformation at the Missouri University of Science and Technology

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2025, Microcredential on Artificial Intelligence, American Academy of Environmental Engineers and Scientists

2026, Council of Engineering and Scientific Certification Boards Policy on Artificial Intelligence

Oerther and Oerther, 2026, The Importance of Transparency, Accountability, and Verifiability When Using Artificial Intelligence in Nursing Education, https://doi.org/10.1016/j.nepr.2025.104557

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Epilogue

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Appendices

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