**Brian D. Fath**

Department of Biological Sciences, Towson University, 8000 York Road, Towson, Maryland, 21252

410-704-2535 (ph), 410-704-2405 (fax), bfath@towson.edu, http://pages.towson.edu/bfath

Google Scholar Statistics (April 13, 2023): Citations=11275, h-index=53, i10-index=135

Positions

Professor, Biological Sciences, Towson University. 2001–present (promoted to Professor in 2011).

Senior Research Scholar, Advancing Systems Analysis Program, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria. 2002–present.

Founding Editor in Chief, *Frontiers in Sustainable Resource Management*. 2022–present.

Book series co-editor, *Science of Sustainable Systems*. 2019–present.

Scientific Coordinator, Young Scientists Summer Program, IIASA, Laxenburg, Austria. 2011–present.

Visiting faculty, Beijing Normal University, Beijing, China. 2009–present.

Guest Professor, State Key Lab Urban & Regional Ecology, Chinese Academy of Sciences. 2013–present.

Planetary Health Lab, Team member, University of Edinburgh, Scotland 2020-present

Education

University of Georgia, Athens, Georgia. Ph.D. *Ecology*. 1998. Summa Cum Laude.

Ohio State University, Columbus, Ohio. M.S. *Environmental Science*. 1993. Magna Cum Laude.

Miami University, Oxford, Ohio. B.S. *Physics.* B.S. *Aeronautics*. 1990. Magna Cum Laude.

###### **Teaching**

*Towson University*, Towson, Maryland. 2001–present.

BIOL 105: **Environmental Biology** F01, S02, F02, S03, F03, S04, F04, S05, F05, S07, F08, S09, S10, F10, S11, FA11, FA12, SP13. FA15, FA16, SP17, FA17, SP18, FA18, SP19, SP20, SP21, FA21, SP22, SP23, FA23.

BIOL 204: **Education and Career Planning for the Biologist** S11, S12.

BIOL 306: **Human Ecology and Sustainability** S04, S05, S06, S07. S09, S10, SP11, SP13, SP14, SP16, SP17, SP18, SP19, SP20, SP21, SP22, SP23.

BIOL 486: **Senior Biology Seminar** S03, S06.

BIOL 490: **Independent Study in Biology** F14.

BIOL 491: **Independent Study in Biology** S10, S11, S14, SP16, FA17, FA18, SP21.

BIOL 797: **Graduate Seminar** S03, F20, SP22.

ENVS 432: **Special Topics in Environment** FA16.

ENVS 471: **Independent Study in Environmental Science** S03, S04, S06, S09.

ENVS 482: **Environmental Research** S04, S06, FA11, FA18, SP20, FA20.

ENVS 491: **Environmental Science Senior Seminar** F06, FA13, FA14.

ENVS 604: **Ecosystem Ecology** F02, F03, F04, F05, F06, F07, F08. F09, F10, FA11, FA12, FA13, FA14, FA15, FA16, FA17, FA18, FA20, FA21. FA23.

ENVS 670: **Independent Study in ENVS** SP16, SP18, SP19.

ENVS 682: **Special Topics in Environment** FA16.

ENVS 798: **Environmental Practicum** S04.

ENVS 896/897/898/899: **Environmental Thesis** F05, S06, F07, S07, S08, F08, F09, S10, FA12, SP13, FA13, SP14, FA14, FA16, SP17, FA17, SP22, SP23, SU23, FA23.

HONR 497: **Honors Independent Investigation** S11.

IDNM 315: **Networks: Science of Connections** S06, F07.

PHYS 795: **Applied Physics Research** SP22, SU23

PHYS 896/897/899: FA22, SP23, FA23

###### Invited International Courses

Austria, University of Natural Resources and Life Sciences, Vienna – one half day lecture in three-week course

**Alternative Economic and Monetary Systems**. July – August 2016.

**Alternative Economic and Monetary Systems**. August 2017.

**Alternative Economic and Monetary Systems**. August 2018.

**Alternative Economic and Monetary Systems**. July 2019.

**Alternative Economic and Monetary Systems**. July 2020.

**Alternative Economic and Monetary Systems**. July 2021.

**Alternative Economic and Monetary Systems**. July 2022.

Austria, University of Salzburg. International Society for Ecological Modelling, pre-conference workshop,

**Network Analysis: Intro and applications**. October 2019. (with S. Borrett, C. Kazanci, & U. Scharler)

Canada, University of Toronto, Scarborough. Int. Society for Ecological Modelling, pre-conference workshop

**Network Analysis: Intro and applications**. May 2023. (with S. Borrett)

China, Beijing Normal University – one-week graduate course

**Ecological Network Analysis**. January 2009.

**Environmental Resource Accounting using Ecological Network Analysis**. May 2013.

**Ecological Network Analysis primer**. 30 – 31 December 2017.

China, Tsinghua University – one-week graduate course – 111 Talents Program

**Systems Ecology & Ecological Network Analysis**. January 2015.

**Networks and Applications**. December 2018.

China, East China Normal University, Shanghai – one-week graduate course

**Systems Ecology: Tools for understanding sustainability**. December 2015.

Croatia, University of Zagreb – one-week masters course

**Environmental Biology**. January 2005.

Czech Republic, Masaryk University, Brno. Fulbright Distinguished Chair in Sustainability

**Biophysical Resources and Socio-Economic Systems**. Undergraduate lectures. Sept–Dec 2019.

**Framework for Sustainability**. Graduate lectures. Sept–Dec 2019.

Czech Republic, Masaryk University, Brno.

**Limits to Growth**. Online undergraduate lectures. May 2021.

**Foundations of Network Analysis**. Ph.D. i-CONN lectures. August 2021.

**Framework for Sustainability**. Graduate lectures. Sept–Dec 2022.

Denmark, Danish University of Pharmaceutical Sciences – one-week graduate course

**Ecosystem Theory**. May 2005.

Denmark, University of Copenhagen – one-week Ph.D. course

**Ecosystem Modelling**. June 2005.

**Ecological Networks**. June 2006.

Egypt, 16 September 2022 (online).

**Systems Analysis Training Module: Network Methods and applications**

Finland, University of Helsinki – workshop on sustainability

**Foundations *for* Sustainability**. January 2020.

France, French Research Institute for Exploitation of the Sea, Sete – 3-day advanced course

**Economic vs ecological networks: integrating economy and ecology in scenario building for marine ecosystems.** November 2009.

Germany, University of Kiel – two-week masters course

**Ecosystem Theory and Ecological Indicators**. June 2009. (European Masters in Applied Ecology)

**Environmental Development and Dynamics**. January 2010. (European Masters in Applied Ecology)

**Environmental Development and Dynamics**. January 2011. (European Masters in Applied Ecology)

Italy, Parthenope University of Naples - Fulbright Distinguished Chair in Environmental Accounting

**Environmental Resource Accounting using Ecological Network Analysis**. February 2012.

**Socio-ecological Systems and Sustainability**. March–May, 2012.

Italy, Parthenope University of Naples – two day intensive graduate lectures, May 2019.

**Ecological Network Analysis and Systems Ecology: Tools for understanding sustainability**

Italy, Parthenope University of Naples – two day intensive graduate lectures, October 2022.

**Ecological Network Analysis and Systems Ecology: Tools for understanding sustainability**

Portugal, University of Coimbra – two-week masters course

**Environmental Management and Modeling**. October 1997.

**Environmental Management and Modeling**. October 1999.

**Environmental Management and Modeling**. May 2002.

**Environmental Management and Modeling**. May 2004.

**Environmental Management of Ecosystems**. May 2006.

**Environmental Management of Ecosystems**. May 2008.

**Environmental Quality Assessment and Management**. May 2010.

Russia, Moscow State University – one week graduate course

**Economic Growth: Modelling Dimensions**, February 2011.

**Publications**

#### Books:

9. Koppl R, Cazzolla Gatti R, Devereaux A, **Fath BD**, Herriot J, Hordijk W, Kauffman S, Ulanowicz RE, Valverde S. 2023. *Explaining Technology*. Cambridge Elements, Cambridge University Press.

8. **Fath BD**, Jørgensen SE. 2021. (Editors) Environmental Management Handbook. 6 Volumes. 2nd edition. Taylor and Francis.

Vol. 1: Managing Global Resources and Universal Processes, 558 pp.

Vol. 2: Managing Biological and Ecological Systems, 427 pp.

Vol. 3: Managing Soils and Terrestrial Systems, 642 pp.

Vol. 4: Managing Water Resources and Hydrological Systems, 737 pp.

Vol. 5: Managing Air Quality and Energy Systems, 823 pp.

Vol. 6: Managing Human and Social Systems, 520 pp.

7. Nielsen, SN, **Fath BD**, Bastianoni S, Marques JC, Müller F, Patten BC, Ulanowicz RE, Tiezzi E, Jørgensen SE. 2020. *A New Ecology: Systems perspective* 2nd edition. Elsevier. 259 pp.

6. Fiscus DA, **Fath BD**. 2019. *Foundations for Sustainability: A Coherent Framework of Life–Environment Relations*. Academic Press. London. 266 pp.

5. **Fath BD** (Editor in Chief). 2018. *Encyclopedia of Ecology* 2nd edition. Elsevier, London. 4 Volumes

Vol. 1: Aquatic Ecology, Behavioral Ecology, Conservation Ecology, Ecological Complexity 662 pp.

Vol. 2: Ecological data Analysis, Ecological Processes, Ecosystems, 710 pp.

Vol. 3: Evolutionary Ecology, General Ecology, 661 pp.

Vol. 4: Global Change Ecology, Human Ecology and Sustainability, Terrestrial and Landscape Ecology, 663 pp.

4. Jørgensen SE, **Fath BD**, Nielsen SN, Pulselli F, Fiscus D, Bastianoni S. 2015. *Flourishing Within Limits to Growth: Following nature’s way*. Earthscan Publisher. 220 pp.

3. Jørgensen SE, **Fath BD**. 2011. *Fundamentals of Ecological Modelling: Applications in environmental management and research*, 4th edition. Elsevier. 399 pp.

2. Jørgensen SE, **Fath BD** (editors). 2008. *Encyclopedia of Ecology*. Elsevier, London. 5 Volumes. 4122 pp.

1. Jørgensen SE, **Fath BD**, Bastianoni S, Marques JC, Müller F, Nielsen SN, Patten BC, Tiezzi E, Ulanowicz RE. 2007. *A New Ecology: Systems perspective*. Elsevier, Amsterdam. 275 pp.

*Journal Articles:*

143. Luo Z, Yu Y, Kharrazi A, **Fath BD**, Matsubae K, Liang S. Chen D, Zhu B, Ma T, Hu S. 2023. Decreasing resilience of China’s coupled nitrogen–phosphorus cycling network requires urgent action. *Nature Food*.

142. Riera R, **Fath BD**, Herrera AM, Rodríguez RA. 2023. Concerns regarding the proposal for an ecological equation of state: an assessment starting from the organic biophysics of ecosystems (OBEC). *Ecological Modelling* 484, 110462, doi.org/10.1016/j.ecolmodel.2023.110462.

141. Rosales FO, **Fath BD**, Llerena GY. 2023. Quantifying a virtual water metabolic network of the Metropolitan District of Quito, Ecuador using ecological network methods. *Journal of Industrial Ecology* https://doi.org/10.1111/jiec.13424

140. Liu Y, Rosado L, Wu A, Melolinna N, Holmqvist J, **Fath B**. 2023. Consequence CO2 footprint analysis of circular economy scenarios in cities. *Cleaner Production Letters* 5,100045, https://doi.org/10.1016/j.clpl.2023.100045.

139. Zisopoulos FK, Noll D, Singh SJ, Schraven D, de Jong M, **Fath BD**, Goerner S, Webster K, Fiscus D, Ulanowicz RE. 2023. Regenerative economics at the service of islands: Assessing the socio-economic metabolism of Samothraki in Greece. *Journal of Cleaner Production* 408, 137136, doi.org/10.1016/j.jclepro.2023.137136.

138. Oliveira B, **Fath BD**. Comparative Resilience Evaluation—Case Study for Six Cities in China, Europe, and the Americas. Land. 2023; 12(6):1182. https://doi.org/10.3390/land12061182

137. **Fath BD**, Strelkovskii N, Wang S, Chen B. 2023. Assessing urban carbon metabolism using network analysis across Chinese and European cities. *Cleaner Production Letters* 4, 100042. https://doi.org/10.1016/j.clpl.2023.100042.

136. Liu L, Lei Y, **Fath BD**, Hubacek K, Yao H, Liu W. 2022. The spatio-temporal dynamics of urban resilience in China's capital cities. *Journal of Cleaner Production* 379 (Part 1), 134400, doi.org/10.1016/j.jclepro.2022.134400.

135. Galychyn O, **Fath BD**. Buonocore E. Franzese PP. 2022. Ecological network analysis of a metabolic urban system based on input–output tables: Model development and case study for the city of Vienna. *Cleaner Production Letters* 3, 100019, doi.org/10.1016/j.clpl.2022.100019.

134. Oliveira BM, Boumans R, **Fath BD**, Harari J. 2022. Coastal ecosystem services and climate change – case study for integrated modeling and valuation. *Global Ecology and Conservation*. doi.org/10.1016/j.gecco.2022.e02240.

133. Yang M, Zhang X, Zhang Y, **Fath BD**. 2022. Consistence of structural changes in food nitrogen consumption between rural and urban residents in the context of rapid urbanization. *Ecological Modelling* 471, 110057.

132. Hyde G, **Fath BD**. 2022. Ecological Network Analysis of State-Level Energy Consumption in Maryland, USA. e*nergies*. 15, 5995. https://doi.org/10.3390/en15165995

131. Oliveira BM, Boumans R, **Fath BD**, Harari J. 2022. Prototype of social-ecological system’s resilience analysis using a dynamic index. *Ecological Indicators*. 141:109113. DOI: 10.1016/j.ecolind.2022.109113

130. Oliveira BM, Boumans R, **Fath BD**, Harari J. 2022. Socio-ecological systems modelling of coastal urban area under a changing climate – Case study for Ubatuba, Brazil. *Ecological Modelling* 468, art. no. 109953. DOI: 10.1016/j.ecolmodel.2022.109953

129. Iskrzyński M, Janssen F, Picciolo F, **Fath B**, Ruzzenenti F. 2021. Cycling and reciprocity in weighted food webs and economic networks. *J Ind Ecol.* 1– 12. [doi.org/10.1111/jiec.13217](https://doi.org/10.1111/jiec.13217)

128. Abduragimova P, **Fath BD**, Gulas C, Katzmair H. 2022. Participatory approach for assessing institutional resilience: A case study of crises in Austria. *Environment, Development and Sustainability*. doi.org/10.1007/s10668-022-02430-3.

127. Galychyn O, **Fath BD**, Shah IH, Buonocore E, Franzese PP. 2022. A multi-criteria framework for assessing urban socio-ecological systems: The emergy nexus of the urban economy and environment. *Cleaner Environmental Systems*. Article Number 100080.

126. Fu C, **Fath BD**, Daigo I, Zhang Y, Deng T. 2022. Tracking urban metabolism flows through the lifecycle of buildings, infrastructure, and durable goods at material, product, and sector levels. *Journal of Cleaner Production* 336, art no. 130402

125. Auad G, Fath BD. 2022. Towards a flourishing blue economy: Identifying obstacles and pathways for its sustainable development. *Current Research in Environmental Sustainability*, 4, 100193, doi.org/10.1016/j.crsust.2022.100193.

124. Voutsa V, Battaglia D, Bracken LJ, Brovelli A, Costescu J, Díaz Muñoz M, **Fath BD**, Funk A, Guirro M, Hein T, Kerschner C, Kimmich C, Lima V, Messé A, Parsons AJ, Perez J, Pöppl R, Prell C, Recinos S, Shi Y, Tiwari S, Turnbull L, Wainwright J, Waxenecker H, Hütt M-T. 2021. Two classes of functional connectivity in dynamical processes in networks. *J. R. Soc. Interface* 18: 20210486. doi.org/10.1098/rsif.2021.0486

123. Lin H, Zebrowski P, **Fath BD**, Liljenstrom H, Rovenskaya E. 2021. Modelling stakeholder satisfaction for conflict resolution in wildlife management: a case of wolf population in Sweden. *European Journal of Wildlife Research*. 67(4), art. no. 61.

122. Zhang X, Zhang Y, Wang Y, **Fath BD**. 2021. Research progress and hotspot analysis for reactive nitrogen flows in macroscopic systems based on a CiteSpace analysis. *Ecological Modelling* 2021, 443, 109456

121. Liu N, Zhang Y, **Fath BD**. 2021. The material metabolism characteristics and growth patterns of the central cities of China's Beijing-Tianjin-Hebei region. *Ecological Modelling* 2021, 448, 109532

120. Diwekar U, Amekudzi-Kennedy A, Bakshi B, Baumgartner R, Boumans R, Burger P, Cabezas H, Egler M, Farley J, **Fath B**, Gleason T, Huang Y, Karunanithi A, Khanna V, Mangan A, Mayer AL, Mukherjee R, Mullally G, Rico-Ramirez V, Shonnard D, Svanström M, Theis T. 2021. A perspective on the role of uncertainty in sustainability science and engineering. *Resources, Conservation and Recycling*, 164, art. no. 105140, DOI: 10.1016/j.resconrec.2020.105140

119. Srbljinovic A, Bozic J, **Fath BD**. 2020. Croatian crisis management system's response to COVID-19 pandemic through the lens of a systemic resilience model. *Interdisciplinary Description of Complex Systems* 18(4), 408-424.

118. Cambardella C, **Fath BD**, Werdenigg A, Gulas C, Katzmair H. 2020. Assessing the Operationalization of Cultural Theory through Surveys Investigating the Social Aspects of Climate Change Policy Making. *Weather, Climate, and Society*. 12(4), 651–665. doi.org/10.1175/WCAS-D-19-0103.1

117. Liang S, Yu Y, Kharrazi A, **Fath BD**, Feng C, Daigger GT, Chen S, Ma T, Zhu B, Mi Z, Yang Z. 2020. Network resilience of phosphorus cycling in China has shifted by natural flows, fertilizer use and dietary transitions between 1600 and 2012. *Nature Food*. Vol 1, 365–375.

116. Kharrazi A, Yu Y, Jacob A, Vora N, **Fath BD**. 2020. Redundancy, Diversity, and Modularity in Network Resilience: Applications for International Trade and Implications for Public Policy. *Current Research in Environmental Sustainability*. Vol 2, 100006. doi.org/10.1016/j.crsust.2020.06.001

115. Cazzolla Gatti R, Koppl R, Fath BD, Kauffman S, Hordijk W, Ulanowicz RE. 2020. On the emergence of ecological and economic niches. *Journal of Bioeconomics* 22, 99–127. doi.org/10.1007/s10818-020-09295-4

114. Barton, M, Alberti M, Ames D, Atkinson J-A, Bales J, Burke E, Chen M, Diallo SY, Earn DJD, Fath B, Feng Z, Gibbons C, Hammond R, Heffernan J, Houser H, Hovmand PS, Kopainsky B, Mabry PL, Mair C, Meier P, Niles R, Nosek B, Osgood N, Pierce S, Polhill JG, Prosser L, Robinson E, Rosenzweig C, Sankaran S, Stange K, Tucker G. 2020. Call for transparency of COVID-19 models. *Science* 368(6490), 482-483. DOI: 10.1126/science.abb8637

113. Labanca N, Pereira ÂG, Watson M, Krieger K, Padovan D, Watts L, Moezzi M, Wallenborn G, Wright R, Laes E, **Fath BD**, Ruzzenenti F, De Moor T, Bauwens T, Mehta L.2020. Transforming innovation for decarbonisation? Insights from combining complex systems and social practice perspectives. *Energy Research and Social Science*, 65, art. no. 101452.

112. Chen S, Long H, Fath BD, Chen B. 2020. Global Urban Carbon Networks: Linking Inventory to Modeling. *Environmental Science and Technology* 2020, 54(9), 5790–5801.

111. Chen S, Kharrazi A, Liang S, **Fath BD**, Lenzen M, Yan J. 2020. Advanced approaches and applications of energy footprints toward the promotion of global sustainability. *Applied Energy*, 261, art. no. 114415.

110. Zhang X, Zhang Y, Fath BD. 2020. Analysis of anthropogenic nitrogen and its influencing factors in Beijing. *Journal of Cleaner Production*, 244, art. no. 118780.

109. Saint-Béat B, Fath BD, Aubry C, Colombet J, Dinasquet J, Fortier L, Galindo V, Grondin P-L, Joux F, Lalande C, LeBlanc M, Raimbault P, Sime-Ngando T, Tremblay J-E, Vaulot D, Maps F, Babin M. 2020. Contrasting pelagic ecosystem functioning in eastern and western Baffin Bay revealed by trophic network modeling. *Elementa*, 8 (1), art. no. 1.

108. Sedighi E., Salmanmahiny A, Mirkarimi H, Daliri H, **Fath B**. 2019. Identification of key drivers of sustainable development in land use planning of Gorgan Township. *Journal of Town and Country Planning*, (in Persian). DOI: 10.22059/jtcp.2019.285863.670010

107. Vora N, **Fath BD**, Khanna V. 2019. A Systems Approach to Assess Trade Dependencies in U.S. Food-Energy-Water Nexus. *Environmental Science and Technology*. 53(18), 10941–10950.

106. **Fath BD**, Asmus H, Asmus R, Baird D, Borrett SR, de Jonge VN, Ludovisi A, Niquil N, Scharler UM, Schückel U, Wolff M. 2019. Ecological network analysis metrics: The need for an entire ecosystem approach in management and policy. *Ocean and Coastal Management* 174, 1-14. DOI: 10.1016/j.ocecoaman.2019.03.007

105. **Fath BD**, Fiscus DA, Goerner SJ, Berea A, Ulanowicz RE. 2019. Measuring regenerative economics: 10 principles and measures undergirding systemic economic health. *Global Transitions* 1, 15-27. doi.org/10.1016/j.glt.2019.02.002.

104. Chen S, Liu Z, Chen B, Zhu F, **Fath BD**, Liang S, Su M, Yang J. 2019. Dynamic Carbon Emission Linkages Across Boundaries. *Earth's Future.* DOI: 10.1029/2018EF000811

103. Wang S, **Fath B**, Chen B. 2019. Energy–water nexus under energy mix scenarios using input–output and ecological network analyses. *Applied Energy* 233-234, 827-839.

102. Li Z, Wang Z, Liu X, **Fath BD**, Liu X, Xu Y, Hutjes R, Kroeze C. 2019. Causal relationship in the interaction between land cover change and underlying surface climate in the grassland ecosystems in China. *Science of the Total Environment* 647, 1080-1087. DOI: 10.1016/j.scitotenv.2018.07.401

101. Li J, Zhang Y, Liu N, **Fath BD**, Hao Y. 2018. Flow analysis of the carbon metabolic processes in Beijing using carbon imbalance and external dependence indices. *Journal of Cleaner Production* 201, 295-307. DOI: 10.1016/j.jclepro.2018.07.306

100. Auad G, Blythe J, Coffman K, **Fath BD**. 2018. A Dynamic Management Framework for Socio-Ecological System Stewardship: A Case Study for the United States Bureau of Ocean Energy Management. *Journal of Environmental Management* 225, 32– 45.

99. Pérez-Guzmána K, Téllez-Leónb I-E, Kharrazi A, **Fath B**, Venegas-Martíneze F. 2018. What makes Input-Output Tables of Trade of Raw Material Goods Peculiar Networks? The World and Mexican Cases. *Revista Mexicana de Economía y Finanzas Nueva Época*, 13(4), 483–505. DOI: http://dx.doi.org/10.21919/remef.v13i4.334

98. Cazzolla Gatti R., **Fath B**, Hordijk W, Kauffman S, Ulanowicz R. 2018. Niche emergence as an autocatalytic process in the evolution of ecosystems. *Journal of Theoretical Biology* 454, 110–117.

97. Riera R, Rodríguez RA, Delgado JD, Herrera AM, **Fath BD**. 2018. Endorheic currents in ecology: an example of the effects from scientific specialization and interdisciplinary isolation. *Interdisciplinary Science Reviews* 43(2), 175–191.

96. Zhang, Y., Wu, Q., Fath, B.D. 2018. Review of spatial analysis of urban carbon metabolism. *Ecological Modelling* 371, 18–24.

95. Patten BC, **Fath BD**. 2018. Notes from an introductory course on Field Systems Ecology. *Ecological Modelling* 368, 33–40.

94. Zhang Y, Wu Q, Wang X, **Fath BD**, Liu G, Hao Y, Li Y. 2017. Analysis of the ecological relationships within the CO2 transfer network created by global trade and its changes from 2001 to 2010. *Journal of Cleaner Production* 168, 1425–1435.

93. Banerjee A, Scharler UM, **Fath BD**, Ray S. 2017. Temporal variation of keystone species and their impact on system performance in a South African estuarine ecosystem. *Ecological Modelling* 363, 207–220.

92. Lopez-Maldonado, Y., Batllori-Sampedro, E., Binder, C.R., Fath, B.D. 2017. Local groundwater balance model: stakeholders’ efforts to address groundwater monitoring and literacy. *Hydrological Sciences Journal* 62(14), 2297–2312.

91. Li Z, Wu W, Liu X, **Fath BD**, Sun H, Liu X, Xiao X, Cao J. 2017. Land use/cover change and regional climate change in an arid grassland ecosystem of Inner Mongolia, China. *Ecological Modelling* 353, 86–94.

90. Haak DM, **Fath BD**, Forbes VE, Martin DR, Pope KL. 2017. Coupling ecological and social network models to assess "transmission" and "contagion" of an aquatic invasive species. *Journal of Environmental Management* 190, 243–251.

89. Wang C, Bi J, **Fath BD**. 2017. Effects of abiotic factors on ecosystem health of Taihu Lake, China based on eco-exergy theory. *Scientific Reports* 7, art. no. 42872.

88. Zheng H, **Fath BD**, Zhang Y. 2017. An Urban Metabolism and Carbon Footprint Analysis of the Jing–Jin–Ji Regional Agglomeration. *Journal of Industrial Ecology* 21(1), 166–179.

87. Kharrazi A, Rovenskaya E, **Fath BD**. 2017. Network Structure Impacts Global Commodity Trade Growth and Resilience. *PlosOne* 190, 243–251.

86. Liu G, Yang Z, **Fath BD**, Shi L, Ulgiati S. 2017. Time and space model of urban pollution migration: Economy-energy-environment nexus network. *Applied Energy* 186, 96–114.

85. **Fath BD**. 2017. Systems ecology, energy networks, and a path to sustainability. Prigogine Lecture. *International Journal of Ecodynamics* 12(1), 1–15.

84. Zhang Y, Lu H, **Fath BD**, Zheng H, Sun X, Li Y. 2016. A Network Flow Analysis of the Nitrogen Metabolism in Beijing, China. *Environmental Science and Technology* 50 (16), 8558–8567.

83. Kharrazi A, **Fath BD**, Katzmair, H. 2016. Advancing Empirical Approaches to the Concept of Resilience: A Critical Examination of Panarchy, Ecological Information, and Statistical Evidence. *Sustainability* 8, 935; doi:10.3390/su8090935

82. Zhang Y, Lu H, **Fath BD**, Zheng, H. 2016. Modelling urban nitrogen metabolic processes based on ecological network analysis: A case of study in Beijing, China. *Ecological Modelling* 337, 29–38.

81. Yang S, **Fath BD**, Chen B. 2016. Ecological network analysis of embodied particulate matter 2.5 – A case study of Beijing. *Applied Energy* 184, 882–888.

80. Zhang Y, Xia L, **Fath BD**, Yang Z, Yin X, Su M, Liu G, Li Y. 2016. Development of a spatially explicit network model of urban metabolism and analysis of the distribution of ecological relationships: case study of Beijing, China. *Journal of Cleaner Production* 112, 4304–4317.

79. Amroabadi B.S., **Fath BD**, Renani M. 2016. Measuring System Entropy Generation in a Complex Economic Network (The Case of Iran). *Quarterly Journal of Quantitative Economics* 12(1), 93–126.

78. Lu W, Su M, **Fath BD**, Zhang M, Hao Y. 2016. A systematic method of evaluation of the Chinese natural gas supply security. *Applied Energy* 165, 858–867.

77. Xia L, **Fath BD**, Scharler UM, Zhang Y. 2016. Spatial variation in the ecological relationships among the components of Beijing's carbon metabolic system. *Science of the Total Environment* 544, 103–113.

76. Kharrazi A, **Fath BD**. 2016. Measuring global oil trade dependencies: An application of the point-wise mutual information method. *Energy Policy* 88, 271–277.

75. Rodríguez RA, Herrera AM, Santander J, Miranda JV, Perdomo ME, Quirós Á, Riera R, **Fath BD**. 2016. From a stationary to a non-stationary ecological state equation: Adding a tool for ecological monitoring. *Ecological Modelling* 320, 44–51.

74. Goerner S, Fiscus DA, **Fath BD.** 2015. Using Energy Network Science (ENS) to connect resilience with the larger story of systemic health and development. *Emergence: Complexity & Organization* 17, 3.

73. Jørgensen SE, Nielsen SN, **Fath BD**. 2015. Recent progress in systems ecology. *Ecological Modelling* 319, 112–118.

72. Zhang Y, Li J, **Fath BD**, Zheng H, Xia L. 2015. Analysis of urban carbon metabolic processes and a description of sectoral characteristics: A case study of Beijing. *Ecological Modelling* 316, 144–154.

71. Häyhä T, Franzese PP, Paletto A, **Fath BD**. 2015. Assessing, valuing, and mapping ecosystem services in Alpine forests. *Ecosystem Services* 14, 12–23.

70. **Fath BD**, Dean CA, Katzmair H. 2015. Navigating the adaptive cycle: an approach to managing the resilience of social systems. *Ecology and Society* 20 (2), 24.

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10. Coffin S, **Fath BD**, Beck MB, Norton BG, Steinemann A. 1999. Designing management strategies that integrate stakeholder beliefs and scientific models: a case study of Lake Lanier. In: Hatcher KJ (ed.) *Proceedings of the 1999 Georgia Water Resources Conference*, University of Georgia, Athens, Georgia, 30–31 March 1999, pp. 405–408.

9. **Fath BD**, Patten BC. 1998. Network orientors: “Utility” as a goal function. In: Müller F, Leupelt M (eds.) *Eco Targets, Goal Functions, and Orientors*, Springer-Verlag, New York, pp. 161–176.

8. Müller F, **Fath BD**. 1998. Introduction: the physical basis of ecological goal functions—fundamentals, problems, and questions. In: Müller F, Leupelt M (eds.) *Eco Targets, Goal Functions, and Orientors*, Springer-Verlag, New York, pp. 15–18.

7. Müller F, **Fath BD**. 1998. Introduction: the physical basis of ecological goal functions—an integrative discussion. In: Müller F, Leupelt M (eds.) *Eco Targets, Goal Functions, and Orientors*, Springer-Verlag, New York, pp. 265–289.

6. Patten BC, **Fath BD**. 1998. Environ theory and analysis: relations between aggradation, dissipation, and cycling in energy—matter flow networks at steady state. In: Ulgiati S, Brown MT, Giampietro M, Herendeen RA, Mayumi K (eds.) *Advances in Energy Studies: Energy Flows in Ecology and Economy*, MUSIS Publisher, Rome, Italy, pp. 483–497.

5. **Fath BD**. 1998. Network analysis: foundations, extensions, and applications of a systems theory of the environment. *Ph.D. Thesis*. University of Georgia, Athens, Georgia, 176 pp.

4. **Fath BD**. 1998. Analysis of indirect effects in a hydrologic model for use in determining potential primary productivity. *IR–98–008. IIASA*, Laxenburg, Austria.

3. **Fath BD**. 1997. Network utility analysis: a non-thermodynamic constraint to trophic transfer efficiency**.** *IR–97–047. IIASA*, Laxenburg, Austria.

2. McDonald CA, **Fath BD**, Garrick R. 1994. Greenhouse Gas Emission Inventory for Ohio 1990. Ohio Department of Development, Office of Energy Efficiency, Columbus, Ohio. 153 pp.

1. **Fath BD**. 1993. Trends and projections of fuel energy resources in the republics of the former Soviet Union. *Masters Degree*. Ohio State University, Columbus, Ohio.

Presentations

1. *Foundations for sustainability, regenerative economics, and soils as connected to both.* Invited presentation (with Dan Fiscus). Urban Soils Institute 8th annual symposium. Governor’s Island, NYC, New York, USA. 17 Nov 2023.
2. InvaPact workshop. Avignon, France 8–12 October 2023.
3. *Biophysical Limits to Growth*. Alternative Economic and Monetary Systems Summer School BOKU. Laxenburg, Austria. 19 July 2023.
4. *Systems Ecology and Sustainability: Learning to flourish within limits*. Keynote presentation. 6th EcoSummit. Gold Coast, Australia. 11 – 15 June 2023.
5. *Encouraging Quality and Equity in Publishing: An Editor’s View*. Keynote address (online). The 2nd World Conference on Scholarly Publishing 2023. TIIKM Publishing, Sri Lanka. 19–20 May 2023.
6. *Comparative Resilience Assessment: case study for six cities in China, Europe and the Americas*. International Society for Ecological Modelling Biennial Global Conference. Toronto, Canada. 2–5 May 2023. Presentation delivered on behalf of co-Author Bruno M. Oliveira.
7. *Urban carbon metabolism network analysis across Chinese and European cities based on input-output and ecological network analyses*. International Society for Ecological Modelling Biennial Global Conference. Toronto, Canada. 2–5 May 2023. Presentation delivered on behalf of co-Author Bruno M. Oliveira.
8. *Sustainability: Regional approaches to a global problem*. Invited presentation. Oregon Ridge Nature Council. Baltimore County, Maryland, 17 April 2023.
9. *Travels in the Old World III: Spreading the sustainability message.* Sabbatical presentation. Department of Biological Sciences, Towson University, 11 April 2023.
10. *Human carrying capacity constraints and lessons from systems ecology*. Invited seminar. Modul University, Vienna, Austria. 20 March 2023.
11. *How ecological systems complexify and diversify through win-win interactions*. Invited presentation. DISordered Systems. Towson University Dept of Art+Design, Art History, Art Education. Towson, Maryland, 2 March 2023.
12. *Achieving Resilience in a Complex World - Guidance for Action from Systems Sciences*. Session co-convener and moderator. IIASA 50th Anniversary Conference. Austrian Academy of Sciences, Vienna, Austria, 17 November 2022.
13. *Urban carbon metabolism network analysis across Chinese and European cities based on input-output and ecological network analyses*. Invited presentation (online), Sustainable City Conference. Rome, Italy. 12 October 2022.
14. *Conbiotic gradient formation in soils and drainage basins: evidence of win-win ecological interactions*. Invited Keynote presentation (online), 14th International Symposium on Ecohydraulics, Nanjing, China. 12 October 2022.
15. *Flourishing Within Limits: Following nature’s way*. Invited Keynote presentation, University of Toronto Scarborough Graduate Symposium (online). 29 September 2022.
16. *Systems Analysis Training Module: Network Methods and applications*. Invited seminar (online). North African Systems Analysis Centre. Cairo, Egypt. 16 September 2022.
17. *Enough: Flourishing within nature’s bounty. Invited presentation*. Trans-Atlantic Research and Development Interchange on Sustainability (TARDIS), Miskolc, Hungary, 13–16 September 2022.
18. *Encouraging quality and equity in publishing: An editor’s view*. Keynote presentation (online). World Conference on Scholarly Publishing. Sri Lanka. 30 August 2022.
19. *Using systems analysis to respond to socio-environmental challenges*. Keynote presentation (online). Southern Africa Systems Analysis Centre. Pretoria, South Africa. 16 August 2022.
20. *Urban carbon metabolism network analysis across Chinese and European cities based on input-output and ecological network analyses*. RECREATE Partners Meeting. Malmö, Sweden. 8–10 August 2022
21. *Flourishing Within Limits: Following nature’s way*. Quantitative Human Ecology Conference, ICTP Trieste, Italy. 25–29 July 2022
22. *Biophysical Limits to Growth*. Alternative Economic and Monetary Systems Summer School BOKU. Laxenburg, Austria. 21 July 2022.
23. *Publishing High Quality Papers: view from an editor*. YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. 20 July 2022.
24. Panelist: The role of secondments in the education of early-stage researchers. 3rd Annual Workshop of the i-CONN Innovative Training Network. Bremen, Germany. 20–22 June 2022.
25. *YSSP Speed talks.* Convener and moderator. IIASA 50th Anniversary Conference. Boston University, Boston, MA, 26 May 2022.
26. *Systems Thinking, Systems Ecology and Sustainability*. Invited seminar (online). Advancing Systems Analysis Seminar Series, IIASA, Laxenburg, Austria. 19 May 2022.
27. *Steps toward a sustainable society: lessons from systems ecology.* Invited seminar (online). Gorgan University of Agricultural Sci. & Natural Resources, Gorgan, Iran, 16 May 2022.
28. *Systems Ecology and Ecological Complexity.* Invited seminar (online)*.* Understanding genes to ecosystems ecology through modern research Symposium. Visva-Bharati University, Santiniketan, India. 25 March 2022.
29. *Systems Analysis of Embodied Water: Implications for Sustainability.* Invited seminar (online). LUMS: Centre for Water Informatics & Technology. Lahore, Pakistan. 8 December 2021.
30. *Planetary Health from an Ecologist's Perspective.* Invited seminar.European Society of Medicine Conference. Vienna, Austria. 13 November 2021.
31. *Using regenerative economics to flourish within the limits to growth.* Invited seminar (online). IIASA Economic Frontiers Forum. 3 November 2021.
32. *Understanding Urban Metabolism to Promote Regenerative Economy.* Towson University. 1st Annual FACET Research Symposium. 29 October 2021.
33. *Baltimore County Environmental Stewardship: Past, present, and future.* Towsontowne Rotary. Cockeysville, Maryland. 22 September 2021.
34. *Introduction to Systems Thinking.* YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. 28 July 2021.
35. *Publishing High Quality Papers: view from an editor.* YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. 27 July 2021.
36. *Publishing High Quality Papers: view from an editor.* Invited seminar (online). The International Institute of Knowledge Management (TIIKM), Sri Lanka. 27 July 2021.
37. *Foundations for Sustainability.* Invited Lecture (online). Konrad Lorenz Institute, Vienna, Austria, 1 July 2021.
38. *Resilience and the adaptive cycle*. Invited Lecture (online). Madam Curie Ph.D. consortium: i-CONN. Durham, United Kingdom. 22 April 2021.
39. *Ecological Principles and Network Mutualism*. Invited Lecture (online). 6th Viennese Workshop on Resilience and Networks. Vienna, Austria. 7 April 2021.
40. *The Nature of the Economic Emergence: discovering your niche in the platform ecology.* Invited Lecture (video presentation, with Roger Koppl and Roberto Cazzola Gatti). Luohan Aademy, Hangzhou, China. February 1, 2021.
41. *Overview of the Young Scientists Summer Program at IIASA*. Invited Lecture (online). Swedish Academy of Sciences. Stockholm, Sweden. December 2020.
42. *Overview of the Young Scientists Summer Program at IIASA*. Invited Lecture (online). U.S. National Academy of Sciences. Washington, DC USA. 30 November 2020.
43. *Foundations for Sustainability.* Invited lecture with D.A. Fiscus (online). National Socio-Environmental Synthesis Center. Annapolis, MD, USA. 22 September 2020.
44. *Resilient Systems Show a Trade-Off between Efficiency and Redundancy*. Invited Lecture (video presentation). American Institute of Chemical Engineers. Resilience workshop. September 2020.
45. *Publishing High Quality Papers: view from an editor.* YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. August 2020.
46. *Biophysical Limits to Growth.* Alternative Economic and Monetary Systems Summer School BOKU. Laxenburg, July 2020.
47. *Systems Series III: Cultural theory of world views* (online). YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. July 2020.
48. *Systems Series II: Some contributions of systems thinking* (online). YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. June 2020.
49. *Systems Series I: Craft of systems analysis* (online). YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. June 2020.
50. *Systems Theory and Application: An ecologist's perspective*. Invited Lecture (online). Institute of Advanced Studies of the University of São Paulo, Brazil. 5 March 2020.
51. *Foundations for Sustainability.* Invited lecture. Department of Geography, Helsinki University, Helsinki, Finland. 17 January 2020.
52. *Training Young Scientists in Systems Analysis*. South Africa Conference on Systems Analysis. Pretoria, South Africa. 3 December 2019.
53. *Fulbright Progress Report.* U.S. Consulate. Prague, Czech Republic. 29 November 2019
54. *Ecological Network Analysis: Methods to reveal indirect pathways, application to urban metabolism*. Invited Lecture. University of Groningen, The Netherlands. 19 November 2019.
55. *Foundations for Sustainability.* Invited lecture. Department of Geography, Masaryk University, Brno, Czech Republic. 6 November 2019.
56. *Foundations for Sustainability*. International Society for Ecological Modelling Biennial Global Conference. Salzburg, Austria 30 Sept – 4 October, 2019.
57. *Network and perceptual uncertainty as opportunities to aid sustainability.* Invited Presentation. Trans-Atlantic Research and Development Interchange on Sustainability (TARDIS), Estes Park, Colorado, USA. 9–11 September 2019.
58. *Biophysical Limits to Growth.* Alternative Economic and Monetary Systems Summer School BOKU. Laxenburg, 31 July 2019.
59. *Ecological Network Analysis: Methods to reveal indirect pathways, application to urban metabolism.* Keynote presentation. International Conference on Energy, Ecology and Environment. Stavanger, Norway. 23–26 July 2019.
60. *Publishing High Quality Papers: view from an editor.* YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. 28 June 2018.
61. *Foundations for Sustainability.* Invited Presentation. Parthenope University, Naples, Italy. 24 May 2019.
62. *Foundations for Sustainability.* Towson University Environmental Conference. Towson, MD, USA. 3 April 2019.
63. *Complex Gradient Formation in Soils: evidence of win-win ecological interactions* Towson Soil Society of America, San Diego, CA, USA, January 2019. Remote video presentation.
64. *Foundations for Sustainability*. School of Environment, Beijing Normal University, Beijing, China. 2 January 2019.
65. *Network Models and Applications* School of Environment, Tsinghua University, Beijing, China. 29 December 2018.
66. *General Laws of Ecology: Thermodynamics and the ten-percent rule.* International Conference of Ecological Sciences. Rennes, France. 22–25, October 2018.
67. *Investigations of sustainability and resilience using a network of networks approach.* Invited presentations. Texas A&M University, Department of Wildlife, College Station, TX. 21 September 2018.
68. *Flourishing within limits: Using ecological systems’ principles for regenerative economics.* Alternative Economic and Monetary Systems Summer School BOKU. Laxenburg, Austria. 1 August 2018.
69. *Introduction to Networks.* YSSP Seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. 12 July 2018.
70. *Publishing high quality papers: view from an editor.* YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. 28 June 2018.
71. *Ecological network analysis as a basis for regenerative economics*. Invited seminar. Laval University. Quebec City, Canada. 13 April 2018.
72. *Ecological perspective: Governance resilience and natural resources management*. Invited panelist, National Academies of Sciences, Engineering, and Medicine. Committee on Offshore Science and Assessment. Washington, DC, USA. 11 April 2018
73. *Program report on the YSSP*. Invited Speaker. National Academies of Science. Washington, DC, USA. 4 April 2018.
74. *Flourishing within Limits to Growth: Revising Economic Systems by Using Nature as a Model*. Invited presentation. Energy Sustainability in the Transition to Renewables: Framings from Social Practices and Complex Systems Theories. Exploratory Workshop organized by the European Commission - Joint Research Centre. Ispra, Italy. 20 – 21 March, 2018.
75. *Systems Theory and Application: An ecologist's perspective:* Invited presentation. University of Koblenz-Landau, Landau, Germany. 26 January 2018.
76. *1. Introduction to systems thinking. 2. The craft of systems analysis. 3. From Sustainababble to Sustainable: Systems analysis to make the world a better place.* Invited lectures. South Africa Systems Analysis Centre Ph.D. Inception Programme. University of the Western Cape, Cape Town, South Africa. 18 January 2018.
77. *Information based ecological network analysis for environmental management*. Invited presentation. University of Kwa-Zulu Natal, Durban, South Africa. 16 January 2018.
78. *Food, Energy, Water Nexus: Intersection of human consumption and well-being*. Invited lecture with N. Fath. School of Environment, Beijing Normal University, Beijing, China. 5 January 2018.
79. *Application of systems thinking and ecological models to reduce environmental fragmentation.* Invited presentation. Shandong Normal University, Jinan, China. 2 January 2018.
80. *Ecosystem services – the benefits people get from nature*. Invited lecture. School of Environment, Beijing Normal University, Beijing, China. 29 December 2017.
81. *Trade-off analysis of forest ecosystem services – a modelling approach.* Opponent’s presentation. Stockholm University, Stockholm, Sweden. 24 November 2017.
82. *Ecological Network Analysis: comparative or benchmark metrics?* Invited presentation. Workshop: use of coastal and estuarine food web models in politics and management: The need for an entire ecosystem approach. Sylt, Germany. 25 – 27 September 2017.
83. *Application of point-wise mutual information to ecological and economic systems.* International Society for Ecological Modelling. Biennial Global Conference. Jeju, Korea. 18 – 21 September 2017.
84. *Application of systems thinking and ecological models to reduce environmental fragmentation.* Keynote presentation. International Society for Ecological Modelling. Biennial Global Conference. Jeju, Korea. 18 – 21 September 2017.
85. *Systems ecology and ecological growth and development: How nature flourishes under constraints.* Alternative Economic and Monetary Systems Summer School BOKU. Laxenburg, Austria. 6 August 2017.
86. *Systems ecology and sustainability.* IIASA and IASCYS Joint workshop. Laxenburg, Austria. 10 July 2017.
87. *Flow and information-theory based Ecological Network Analysis.* Vienna University networks workshop. Vienna, Austria. 29 June 2017.
88. *Publishing high quality papers: view from an editor.* YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. 26 June 2017.
89. *Locus iste: co-evolution of place and culture to avert fragmentation across and within landscapes.* 5th Viennese Talks on Resilience and Networks. Vienna, Austria. 22 May 2017.
90. *Ecological insights to promote regenerative economics***.** Invited lecture. Kennedy School for Government, Harvard University. Cambridge, MA, April 17, 2017.
91. *Ecological insights to promote regenerative economics***.** Invited lecture. New School. New York, New York. April 18, 2017.
92. *Resilience along the adaptive cycle: lessons for life-cycle preparedness.* Invited lecture, Bureau of Ocean Energy Management, Department of Interior. Sterling, Virginia. September 19, 2016.
93. *Using regenerative economics to flourish within the limits to growth.* EcoSummit 2016. Montpellier, France. 31 August 2016.
94. *Ecological and social system bioenergetics: open loop or autocatalytic.* EcoSummit 2016. Montpellier, France. 31 August 2016.
95. *Understanding ecosystem dynamics for design of socio-economic systems: following nature’s way.* Invited Lecture. European Forum Alpbach, Technology Symposium. Alpbach, Austria. 28 August 2016.
96. *Cycles and time constants in nature.* Invited Lecture. Summer School on Alternative Economic and Monetary Systems. University of Natural Resources and Life Sciences, Vienna, Austria. 8 August 2016.
97. *Systems ecology, energy networks, and a path to sustainability.* Keynote Prigogine AwardLecture. 11th International Conference on Sustainable Cities. Alicante, Spain. 13 July 2016.
98. *Urban Metabolism and Regenerative Economics.* Invited Lecture. 11th International Conference on Sustainable Cities. Alicante, Spain. 12 July 2016.
99. *Publishing high quality papers: view from an editor.* YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. 29 June 2016.
100. *Systems ecological approaches to analyze network of networks.* Danube Research Center, Hungarian Academy of Sciences. Budapest, Hungary. 24 June 2016.
101. *Resilience and navigating the adaptive cycle.* Research Alliance for Regenerative Economics Workshop. Trenton, New Jersey. 25 May 2016.
102. *Publishing high quality papers: view from an editor.* International Society for Ecological Modelling Global Conference. Towson University. Towson, Maryland. 8–12 May 2016.
103. *Trophic transfer efficiency: origins, justifications, and applications in ecological models*. International Society for Ecological Modelling Global Conference. Towson University. Towson, Maryland. 8 –12 May 2016.
104. *Flourishing within the limits* (with Dan Fiscus)*.* International Society for Ecological Modelling Global Conference. Towson University. Towson, Maryland. 8 –12 May, 2016.
105. *Flourishing within the limits.* Towson University Environmental Conference, Towson, Maryland. 15 April 2016.
106. *Food-energy-water nexus: The role for energy network science*. 16th annual conference of the National Council for Science and the Environment. World Café on Models, Metrics, and Data. Washington DC. 19–21 January 2016.
107. *Food-energy-water nexus: network metrics*. 16th annual conference of the National Council for Science and the Environment. S-A5 Metrics for Food-Energy-Water Projects. Washington DC. 19–21 January 2016.
108. *Systems perspective in ecosystem and environmental management*. Workshop of the Research Alliance for Regenerative Economy. Towson University, Towson, Maryland. 13–14 January 2016.
109. *Energy network science: metrics for assessing a regenerative economy*. 9th biennial conference on emergy and environmental accounting. Gainesville, Florida. 7–9 January 2016.
110. *Sustainability of ecological and socio-ecological systems*. Invited Seminar. Hebei University. Baoding, China. 20 December 2015.
111. *Sustainability of complex systems: Insights from ecological dynamics and systems thinking*. Invited Presentation. Systems Analysis Conference. International Institute for Applied Systems Analysis, Laxenburg, Austria. 11 – 13 November 2015.
112. *Flourishing within the limits.* Towson University, Towson, Maryland. 4 November 2015.
113. *Systems ecology and sustainability*. Towson University, Towson, Maryland. 16 October 2015. Sabbatical Presentation
114. *Flourishing within the limits.* IIASA seminar series. International Institute for Applied Systems Analysis, Laxenburg, Austria. 6 August 2015.
115. *Publishing high quality papers: view from an editor.* YSSP seminar. International Institute for Applied Systems Analysis, Laxenburg, Austria. 8 July, 2015.
116. *Quo vadis ecosystem: insights from ecological modelling and systems ecology*. Keynote presentation. Community Surface Dynamic Modeling System Annual Conference. Boulder, Colorado, USA. 26–27, 2015.
117. *Flourishing within the limits.* Invited seminar. West University, Timisoara, Romania. 15 May 2015.
118. *Energy network science to assess social and ecological resilience and systemic health: focus on ecosystems, economic systems, and urban metabolism*. Keynote presentation. 9th Biennial conference on Advances in Energy Studies. Stockholm, Sweden. 4–7 May, 2015.
119. *Network of networks: analysis of coupled human-environment systems and sustainability assessment*. Invited seminar. Parthenope University, Naples, Italy. 1 April, 2015.
120. *How system thinking approaches and the notion of energy metabolism of urban socioeconomic sectors can inform energy conservation policies* (via weblink). Experts' round table on How practice theory and complex adaptive systems theory can inform future energy conservation policies, Ispra, Italy. 26–27 February, 2015.
121. *Science of sustainability, resilience, and cohesion.* 4th Viennese Talks on Resilience and Networks: The Austrian Road to Resilience, Vienna, Austria. 28 January 2015.
122. *Systems analysis and holism: Making a science of inter-dependence.* Southern African–Young Scientists Summer Program, University of Free State, Bloemfontein, South Africa. 21, January 2015.
123. *Land use valuation of ecosystem services in Baltimore County, Maryland: Adaptive change along the complex systems cycle*. Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. Beijing, China. 7 January, 2015.
124. *MRIO applied to assess urban metabolism and carbon footprint analysis of the Jing-Jin-Ji region*. SESYNC Workshop: Linking local consumption to global Impacts. Annapolis, Maryland. 11 December 2014.
125. *Properties of network structures along the adaptive cycle.* European Conference on Ecological Modelling, Marrakech, Morocco. 27–30, October 2014.
126. *Network based-information indicators: Configurations toward Optimal Robustness*. Keynote presentation. 9th International Conference on Ecological Informatics. 20–24, October 2014, Nanjing China.
127. *Navigating the adaptive cycle: An approach to measuring the resilience of social Systems*. Stockholm Resilience Center. Stockholm, Sweden. 19 August 2014.
128. *Ecosystem dynamics along the adaptive cycle*. Swedish Agricultural University, Uppsala, Sweden. 18 August 2014.
129. *Applying energy network analysis to economic flows*. Inter-disciplinary Salon on Resilience and Systemic Health. FHI360, Durham, North Carolina. 22–23 May 2014.
130. *Is sustainability still possible?* Invited Earth Day Speaker. Stevenson University. Stevenson, Maryland. 23 April 2014.
131. *Sustainability and the complex systems cycle: Ecosystem growth, development, and collapse*. Invited Presentation. Center for Complex Systems and Enterprises, Stevens Institute of Technology, Hoboken, New Jersey, USA. 4 April 2014.
132. *Patterns of sustainable urban systems: Networks and biomimcry*. Invited Keynote Speaker, International Workshop on Urban Eco-Complex Modelling. State Key Lab for Urban and Regional Ecology, Chinese Academy of Sciences, Beijing China. 19 March 2014.
133. *Global systems perspective of socio-ecological systems: Setting the stage*. Invited presentation. College of Global Change and Earth Systems Science, Beijing Normal University, Beijing China. 18 March 2014.
134. *Sustainable networks and the complex systems cycle*. Invited Keynote Speaker, International Conference on Environmental Biology and Ecological Modelling. Santiniketan, India. 24–26 February 2014.
135. *Network-based analysis and measurement of social cohesion and resilience of critical systems in Austria: project overview and preliminary insights* (with Harald Katzmair and Carly Dean). International Institute for Applied Systems Analysis. Laxenburg, Austria. 20 February 2014.
136. *Systems ecology: Where are the boundaries?* 8th Biennial Emergy Conference. Gainesville, Florida. 16–18 January 2014.
137. *Applied systems analysis for ecosystem and environmental management*. SA-YSSP. University of Free State. Bloemfontein, South Africa. 3 January 2014.
138. *Ecological network analysis: Indirect trophic relations in cross-disciplinary applications*. National Socio-environmental Synthesis Center. 11–13 December 2013. Annapolis, Maryland.
139. *Conceptual models of ecological dynamics: Indicators of regime change*. Invited Keynote Speaker, International Society for Ecological Modelling, 28 – 31 October 2013. Toulouse, France.
140. *Quantifying economic and ecological sustainability*. Invited Keynote Speaker, ECSA 53: Estuaries and coastal areas in times of intense change, 13–17 October 2013. Shanghai, China.
141. *Cohesively clinging to the complex systems cycle: Ecosystem growth, development, and collapse*. 3rd Viennese Talks on Resilience Research & Networks: Vienna, Austria, 21 June 2013.
142. *Systems perspective in ecosystem and environmental management*. Invited Presentation, Dept. of Ecological Sciences Tsinghua University, Beijing, China, 29 May 2013.
143. *City as a system: energetic and organizational design principles to measure and cope with rapid urbanization*. Keynote Presentation, International Workshop on Ecological Integration to Meet the Challenge of Fast Urbanization, State Key Laboratory of Urban and Regional Ecology, Chinese Academy of Sciences, Beijing, China, 26 – 27 May 2013.
144. *Ecosystem service valuation of land use change in Baltimore County: Change along the complex systems cycle.* Ecosystem Services Partnership Workshop, Kiel, Germany. 6–8 May 2013.
145. *Sustainable systems have interlocking enviro-types: The contributions of systems thinking*. Systems Ecology: A Network Perspective and Retrospective, Odum School of Ecology, University of Georgia, Athens, Georgia. 12 – 14 April 2013.
146. *The Science of sustainability from the perspective of ecological system dynamics*. SA-YSSP. University of Free State. Bloemfontein, South Africa. 23 January 2013.
147. *The craft of systems analysis* (with Roger Levien). SA-YSSP. University of Free State. Bloemfontein, South Africa. 16 January 2013.
148. *Sustainable systems are closed to efficient cause*. EcoSummit 2012 - Ecological Sustainability: Restoring the Planet's Ecosystem Services. Columbus, Ohio 30 Sept – 5 October 2012.
149. *Review of recent lake models in ecological modeling*. EcoSummit 2012 - Ecological Sustainability: Restoring the Planet's Ecosystem Services. Columbus, Ohio 30 Sept – 5 October 2012.
150. *Using thermodynamics and networks to understand ecological complexity*. Invited Keynote Presentation. International Conference on Hydropedology. Leipzig, Germany. 23 July, 2012
151. *Elsevier author workshop: getting published, getting cited in international ecological scientific journals.* 6th International Conference on Environmental Modeling and Software. Leipzig, Germany. 1–5 July, 2012.
152. *Ecological flow analysis of network collapse I: New methodologies to investigate network collapse dynamics.* 6th International Conference on Environmental Modeling and Software. Leipzig, Germany. 1–5 July, 2012.
153. *Ecological network analysis: If everything is connected to everything else, then how can we ever know anything?* International Institute for Applied Systems Analysis. Laxenburg, Austria. 14 June 2012.
154. *Ecological complexity, networks, and the adaptive cycle.* University of Salento, Lecce, Italy, 25 May 2012.
155. *Ecological thermodynamics and complex adaptive cycles: hints toward system sustainability.* University of Siena, Department of Chemistry, Siena, Italy, 11 May 2012.
156. *History of American environmentalism: Development along the complex system cycle*. Seminar on American Literature, History and Culture, Center for American Studies, Rome, Italy, 9 May 2012.
157. *Long-term ecosystem dynamics: A pattern for sustainable systems*. TARDIS 2012 Trans-Atlantic Research & Development Interchange on Sustainability Scientific Workshop, Leibnitz, Austria. 22–25 April 2012.
158. *Systems perspective in ecosystem and environmental management*. UNESCO’s Natural Sciences Sector Seminar, Paris, France. 19 March 2012.
159. *Publishing high quality papers.* Mediterranean Agronomic Institute, Bari, Italy. 6 March 2012.
160. *Network analysis methods for understanding complex ecological systems*. Mediterranean Agronomic Institute, Bari, Italy. 5 March 2012.
161. *Environmental and ecological modelling: A thermodynamic network perspective*. Fulbright Distinguished Chair seminar. Naples, Italy, 2 February 2012.
162. *Ecosystem complexity and collapse*. What matters? TU Geography Department, Towson, Maryland, 11 November 2011.
163. *Ecological network analysis of Sylt-Rømø Bight Ecosystem*. International Society of Ecological Modelling Conference. Beijing, China, 23 September 2011.
164. *Transitions to a low carbon economy*. Beijing Development Area. Beijing, China. 22 September 2011.
165. *Publishing high quality papers.* Elsevier Editor’s Workshop, Beijing, China. 20 September 2011.
166. *How ecological modelling contributes to global change science*. Keynote presentation. International Society of Ecological Modelling Conference. Beijing, China. 20 September 2011.
167. *Agent based models*. Dream Valley Workshop, IIASA, Laxenburg, Vienna, 11 August, 2011.
168. *Ecosystem resilience and the adaptive cycle.* 2nd Viennese Talks on Resilience Research & Networks: New perspectives on growth, development and innovation. Vienna, Austria 26–27 May 2011.
169. *Energy as the basis for socio-ecological systems: where we are and where we are headed.* First Presbyterian Church of Towson, April 17, 2011
170. *Sustainable development, ecosystems, and resilience.* Resilience and adaptation to Climate Change Workshop. Vienna, Austria, 21–22 February 2011.
171. *Systems thinking and simulation*. Teacher workshop for Baltimore Ecosystem Study. Towson University, Towson, Maryland, January 22, 2011.
172. *Urban energy metabolism using ecological network analysis: Case study of four Chinese cities.* Advances in Energy Studies Workshop. Barcelona, Spain, 19–21 October 2010.
173. *Climate crisis, well-being and urban network metabolism.* Beijing development Area, Low Carbon Research Center, Beijing, China. 2 August 2010.
174. *Publishing high quality papers.* Elsevier Editor’s Workshop, Beijing Normal University, Beijing, China. 2 August 2010.
175. *Ecosystem goal functions for environmental management.* Beijing School of Forestry, Beijing, China. 1 August 2010.
176. *Socio-ecological systems: Flow analysis.* Institute for Social Ecology, University of Klagenfurt, Vienna, Austria. 29 June 2010.
177. *Ecological networks: Complexity and mutualism.* Viennese Talks on Resilience Research & Networks: New perspectives on growth, development and innovation. Vienna, Austria 27 May 2010.
178. *Exploration of network evolution through bottom-up and top-down approaches.* International Society for Ecological Modelling Conference. Quebec City, Canada. 5–10 October 2009.
179. *Systems analysis: ecological network analysis*. IIASA seminar, Laxenburg, Austria. 2 July 2009.
180. *YSSP workshop on applied systems analysis*, IIASA, Laxenburg, Austria. 1 July 2009.
181. *Interfaces of integrated modelling: Improving socio-economic-environmental models to protect ecosystem services*. Core group lecture, conference on Modelling Ecosystem Services. Lecce, Italy. 26–29 May 2009.
182. *Exploring ecological complexity*. Invited Seminar on the occasion of Robert Ulanowicz’ retirement. Chesapeake Biological Lab, Solomons, Maryland. 16 April 2009.
183. Invited Panelist, Towson Clean Energy Panel. Towson Energy Activists student group. 15 April 2009.
184. *Energy drives all systems: Where we are and where we are heading.* Invited Speaker, Towson University 1st Annual Environmental Conference, 7 April 2009.
185. *Greenhouse gas inventory: overview and workshop objectives*. Towson University Greenhouse Gas Inventory for Educational Institutions. 4 March, 2009.
186. *Ecosystem thermodynamics*. Beijing Normal University, Beijing, China. 12 January 2009.
187. *Ecosystem thermodynamics: goal functions for environmental management*. Sabbatical presentation, Towson University, Towson, Maryland. 18 November 2008.
188. *Comparison of utility analysis and mixed trophic impacts*. Emergence of Novelties Workshop. Pacina, Italy 9–15 October 2008.
189. *Assessing ecological complexity: goal functions and network relations*. Chesapeake Biological Lab Invited seminar, Solomons, Maryland. 1 October 2008.
190. *Network analysis of energy transportation systems: a case study of Eurasian natural gas pipeline model*. Advances in Energy Studies 6th Biennial Workshop: Towards an holistic approach based on science and humanity. Graz, Austria. 29 June – 2 July 2008.
191. *Long term ecosystem dynamics: Can theoretical concepts of environmental change help manage ecosystem services?* Ecosystem Services Workshop: Solution for problems or a problem that needs solution? Salzau, Germany. 13–15 May 2008.
192. *Global macro-economic, energy and environmental scenarios*. Center for Energy, Environment, and Health Workshop. Roskilde, Denmark. 6–7 February 2008.
193. *Cyclic energy pathways in ecological food webs*. European Conference on Ecological Modelling. Trieste, Italy. 27–30 November 2007.
194. *Marine ecological modelling and assessment of the Baltic Sea region*. Symposium for Socio-environmental modelling of Baltic Sea. Uppsala, Sweden. 10 November 2007.
195. *Complex ecological networks: Structural and functional regimes*. Center for Complexity Research, University of Vermont, Burlington, Vermont. 29 October 2007.
196. *Assessing journal quality using bibliometrics: An editor’s perspective*. Elsevier Editor’s Conference. Miami, Florida. 20 October 2007.
197. *Ecological network analysis: Measuring cycling and indirect mutualism*. Invited Seminar, Environmental Science Department, University of Maryland, College Park, Maryland. 7 September 2007.
198. *Energy as the basis for socio-ecological systems: Where we are and where we are headed.* Broadmead Retirement Community, Cockeyesville, Maryland. 5 September 2007.
199. *Network analysis of critical infrastructures: methodology and case study of natural gas pipeline*. IIASA seminar, Laxenburg, Austria. 27 July 2007.
200. *Ecological network analysis: Overview for application to BONUS.* EUROGEN: Evolutionary and deterministic methods for design, optimization and control with applications to industrial and societal problems. Jyväskylä, Finland. 13 June 2007.
201. *Ecosystem networks: Cyclic pathways and indirect mutualism.* Beijing Normal University, China. 28 May 2007.
202. *Identifying ecological-economic relations using network analysis*. 3rd International Eco-Summit, Beijing, China. 25 May 2007.
203. *A new ecology: systems perspective.* Workshop on “What is Life?” Pacina, Italy. 12–18 March 2007.
204. *Building sustainable environmental partnerships: Where are we and what can we learn from nature*. Trinity Episcopal Church, Towson, Maryland. 25 February 2007.
205. *Control and qualitative system analysis using network analysis*. Invited seminar, Moscow State University, Moscow, Russia, 26 December 2006.
206. *Sustainable ecosystem patterns*. Modelling Socio-Natural Systems, Stockholm, Sweden, 25 October 2006.
207. *Eco-exergy: Reductionistic or holistic approaches*. Advances in Energy Studies: Perspectives on Energy Future, Porto Venere, Italy. 15 September 2006.
208. *Exergy in ecology background and challenges*. IIASA seminar, Laxenburg, Austria. 9 August 2006.
209. *Structural food web regimes*. Ecosystem networks workshop, Copenhagen, Denmark. 7–10 June 2006.
210. *Ecosystem theory to guide environmental management*. International Workshop “The Ecosystem Approach to the Convention on Biological Diversity (CBD) – Between scientific concepts and practical demands” Salzau, Germany. 29–31 May 2006.
211. *Ecosystem networks: cyclic pathways and indirect mutualism*. Invited seminar Woods Hole Marine Biological Laboratory, Woods Hole, Massachusetts, 21 March 2006.
212. *Distributed ecological control*. IIASA DYN-NEA Biologizing Control Theory Workshop, Laxenburg, Austria. 19–20 December 2005.
213. *Ecology: the network perspective*. IIASA seminar, Laxenburg, Austria. 15 July 2005.
214. *Ecology: the network perspective*. Invited presentation University of New Mexico Biocomplexity seminar, Albuquerque, New Mexico. 15 April 2005.
215. *Examining ecosystem dynamics using ecological goal functions*. U.S. EPA Workshop on Dynamic Regimes, Cincinnati, Ohio. 10–11 March. 2005.
216. *Community level relations and network mutualism*. Institute of Biological Engineering Annual International Meeting, Athens, Georgia. 4–6 March 2005.
217. *Ecosystem patterns as a guide for sustainability*. AAAS Annual Meeting, Symposium on Science and Policy Transformations for Sustainability, Washington, DC. 19 February 2005.
218. *Energy resources: Past, present and future*. Broadmead Continuing Care Retirement Community, Cockeyesville, Maryland. 6 January 2005.
219. *Network mutualism: Positive community-level relations in ecosystems*. Department Ecology and Environmental Biology, Princeton University, Princeton, New Jersey. 1 December 2004.
220. *Ecosystem growth and development*. Jozef Stefan Institute seminar series, Ljubljana Slovenia. 4 August 2004.
221. *Ecosystems as evolutionary complex systems: A synthesis of two system-theoretic approaches based on Boolean networks*. IIASA seminar, Laxenburg, Austria. 3 August 2004.
222. *Ecosystems as evolutionary complex systems: A synthesis of two system-theoretic approaches based on Boolean networks*. International Environmental Modelling and Software Society, Osnabrück, Germany. 14–17 June 2004.
223. *Ecosystems as complex adaptive hierarchical systems: A case for ecological goal functions.* University of Maryland Center for Environmental Sciences, Appalachian Lab, Frostburg, Maryland. 18 September 2003.
224. *Ecosystem growth and development.* IIASA seminar, Laxenburg, Austria. 1 August 2003.
225. *Ecosystems as complex adaptive hierarchical systems: A case for ecological goal functions.* University of Venice, Venice, Italy. 16 June 2003.
226. *Distributed control in ecological networks.* Workshop on Control of Distributed Systems and Environmental Applications. IIASA, Laxenburg, Austria. 26–27 May. 2003.
227. *Ecosystems as complex adaptive hierarchical systems: A case for ecological goal functions.* IIASA, Laxenburg, Austria. July 2002.
228. *Exergy and information indices: A comparison for use in structurally dynamic models*. International Environmental Modelling and Software Society Conference on Integrated Assessment and Decision Support, Lugano, Switzerland. 24–27 June 2002.
229. *Short- and long-term environmental perceptions: A case study of Lake Lanier.* International workshop: Vulnerability of water quality in intensively developing urban watersheds. Athens, GA. March 2001.
230. *Ecosystems as complex adaptive hierarchical systems: A Case for Ecological Goal Functions.* U.S. EPA Sustainability Seminar Series. Cincinnati, Ohio. March 2001.
231. *Network analysis: foundations and applications of a systems theory of the environment.* Swiss Federal Institute for Environmental Science and Technology. Zurich, Switzerland. October 2000.
232. *Integrating models with stakeholder preferences of water quality indicators*. European Forum on Integrated Environmental Assessment Policy Workshop on Integrated Management of Water Resources. Paris, France. October 2000.
233. *Stakeholder preferences of water quality parameters: A case study of Lake Lanier, Georgia*. 2nd International Eco-Summit: Integrating the Sciences. Halifax, Canada. 18–24 June 2000.
234. *Network thermodynamic analysis: formulation and unification of ecological goal functions*.Advances in Energy Studies: Exploring Supplies, Constraints, and Strategies. Porto Venere, Italy. 23–27 May 2000.
235. *Network synergism in economic input-output models: existence and limitations of the invisible hand.* Advances in Energy Studies: Exploring Supplies, Constraints, and Strategies. Porto Venere, Italy. 23–27 May 2000.
236. *Network thermodynamic analysis: formulation and unification of ecological goal functions*. School of environmental science, engineering & policy. Drexel University, Philadelphia. April 2000.
237. *Integrated environmental assessment: water resources case study and network analysis*. Great Lakes Environmental Research Laboratory. Ann Arbor, Michigan. October 1999.
238. *Reconciling uncertainty using short and long-term management strategies*. European Forum on Integrated Environmental Assessment: Workshop on Uncertainty. Baden, Austria. July 1999.
239. *Integration of stakeholder values and scientific models in management strategies*. National Conference on Environmental Decision Making. Knoxville, Tennessee. 3–6 May 1999.
240. *Integrating community values into scientific models*. Georgia Water Resources Conference. Athens, Georgia. 30–31 March 1999.
241. *Network analysis applied to large-scale ecosystems*. International Society for Ecological Modeling and Ecological Society of America Conference. Baltimore, Maryland. July 1998.
242. *Analysis of indirect effects in a hydrologic model for use in determining potential primary productivity*. International Institute of Applied Systems Analysis, Laxenburg, Austria. August 1997.
243. *Network synergism as an ecological goal function*. Goal Functions Workshop. Salzau, Germany. 30 August–4 September 1996.
244. *Network synergism: why nature is more “green” than “red in tooth and claw.”* 1st International Eco-Summit. Copenhagen, Denmark. 19–23 August 1996.

Co-author\* delivered presentations

Fiscus DA, Fath BD, Goerner SJ, Ulanowicz RE. *Testing applicability of an indicator of ecological network sustainability/robustness to socioeconomic systems*. 100th Annual Meeting of the Ecological Society of America. Baltimore, Maryland. August 9–14, 2015.

Stanley C, Fath BD. *An assessment of Maryland and West Virginia’s urban ecosystem health state using Emergy Synthesis*. 8th Biennial Emergy Research Conference. Gainesville, Florida, January 16 – 18, 2014. (poster)

Dean C, Fath BD. *An historical ecosystem service assessment for Maryland*. EcoSummit 2012 - Ecological Sustainability: Restoring the Planet's Ecosystem Services. Columbus, Ohio 30 Sept – 5 October 2012. (poster)

Dean C, Fath BD. *Analysis of ecosystem service valuation methods: A case study of land use change in Baltimore, Maryland*. Presented at Systems Ecology: A Network Perspective and Retrospective, Odum School of Ecology, University of Georgia, Athens, Georgia. 12 – 14 April 2013. (poster)

Fiscus DA, Fath BD, Goerner SJ. *A tri-modal nature of life applied for actualizing a win-win human-environmental relation and sustainability*. EcoSummit 2012 - Ecological Sustainability: Restoring the Planet's Ecosystem Services. Columbus, Ohio 30 Sept – 5 October 2012.

Scharler U\*, Fath BD. *Network mutualism in ecological and trophic networks.* International Society for Ecological Modelling Conference. Quebec City, Canada. 5–10 October 2009.

Brady PA\*, Fath BD. *Greenhouse gas inventories for Baltimore County and County Government Operations*. USEPA 18th International Greenhouse Gas Inventory Conference, Baltimore, Maryland April 2009.

Berkower C\*, Fath B, Haines S, Boucher L, Mangurian L. *Improving science learning through a faculty partnership*. 7th Annual Lilly Conference on College and University Teaching-East, Towson, Maryland April 2, 2004 (supported by NSF grant #0227325).

Masters B\*, Fath B. *Inquiry-based science course for non-science majors*. 8th Annual Lilly Conference on College and University Teaching-East, Towson, MD April 1, 2005 (supported by NSF grant #0227325).

Borrett SR\*, Fath BD, Patten BC. *Determinants of Pathway Proliferation in Ecological Networks*. Ecological Society of America, Portland, Oregon, August 1–7 2004.

Patten BC\*, Fath BD. *Ecological network analysis: weak links and indirect effects in food webs*. Ecological Society of America Conference, Savannah, Georgia, August 4–7, 2003.

Borrett SR\*, Fath BD, Patten BC. *Investigating Pathway Proliferation in Ecological Networks*. Ecological Society of America, Tucson, Arizona, August 4–9, 2002.

Pawlowski CW\*, Fath BD, Mayer AL, Cabezas H. *Towards a sustainability index using information theory*. UNESCO conference, Sustainable development of energy, water and environment systems. Dubrovnik, Croatia, 2–7 June, 2002.

**Radio Interview/ Podcasts**

Systemic Societal Health from the Planetary Health Lab. Assessing the Human Systems with Network Analysis with Dr. Brian Fath, June 19, 2021

[www.youtube.com/watch?v=DjBpjCggCSU](http://www.youtube.com/watch?v=DjBpjCggCSU)

World Environment Day interview: Dr Dan Fiscus and Dr Brian Fath. 21 May 2021.

<https://sdgresources.relx.com/podcasts/world-environment-day-interview-dr-dan-fiscus-and-dr-brian-fath>

It’s Hot in Here: Environmental News, Views, and Grooves. University of Michigan Radio. 9 October 2015

<http://www.hotinhere.us/podcast/flourishing-within-limits-to-growth/>

Grants/Funding

International Institute for Applied Systems Analysis, Senior Research Scholar. June – August 2023.

Travel grant from Frontiers Publisher for participation in Frontiers Forum, Montreux, Switzerland, April 2023.

Sustainable Urbanisation in the Context of Economic Transformation and Climate Change (RECREATE). JPI Urban Europe funded by the Swedish Energy Agency, the Austrian Research Promotion Agency and the National Natural Science Foundation of China

International Institute for Applied Systems Analysis, Senior Research Scholar. June – August 2022.

International Institute for Applied Systems Analysis, Senior Research Scholar. June – August 2021.

International Institute for Applied Systems Analysis, Senior Research Scholar. June – August 2020.

International Institute for Applied Systems Analysis, Senior Research Scholar. June – August 2019.

Fulbright Distinguished Chair in Sustainability. Masaryk University, Brno, Czech Republic. Fall 2019.

International Institute for Applied Systems Analysis, Senior Research Scholar. June – August 2018.

Austrian Climate Research Programme. (WG: ACRP10 - RIPA - KR17AC0K13717) “The Roadmap to the Implementation of the Paris Agreement” with FAS.Research Vienna, Austria. Jan 2018 – Dec 2019.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2017.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2016.

NOAA-NFA-NFAPO-2014-2003949; Broad Agency Announcement (BAA). $10,000 to support international travelers to attend ISEM conference at Towson University.

International Institute for Applied Systems Analysis, Research Scholar. February – August 2015.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2014.

Austrian security research program (KIRAS/BMVIT). “Resilience Monitor - Development of a software-based method for network-based analysis and measurement of social cohesion and resilience of critical systems using the example of Austria” with FAS.Research Vienna, Austria. Oct 1 2013 – Sept 30 2015. 40.000 €.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2013.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2012.

Fulbright Distinguished Chair. Parthenope University, Naples, Italy, January – May 2012.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2011.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2010.

European Masters in Applied Ecology, September 2009 – July 2011.

*Towson University,* Travel Grant International Society for Ecological Modelling Conference. Quebec City, Canada. 5–10 October 2009. $850 (partial funding – hotel and per diem paid for by ISEM).

International Institute for Applied Systems Analysis, Research Scholar. June – August 2009.

International Institute for Applied Systems Analysis, Research Scholar. January – August 2008.

*Towson University*. Travel Grant. Ecosystem Services Workshop, Salzau, Germany. 12–15 May 2008. $461.

*Towson University*. Travel Grant. Symposium for Socio-environmental modelling of Baltic Sea. Uppsala, Sweden. 9–13 November 2007. $1100.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2007.

*Towson University*. Travel Grant. 3rd International Eco-Summit. Beijing, China. 21–28 May 2007. $1502 (partial funding – airfare paid by IIASA).

*Towson University* Travel Grant. Advances in Energy Strategies Workshop. Porto Venere, Italy. 11–17 September 2006. $800 (partial funding – airfare paid by IIASA).

International Institute for Applied Systems Analysis, Research Scholar. June – August 2006.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2005.

*Towson University.* Summer Research Stipend. 2005.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2004.

*National Science Foundation*. Vertically Integrated Partnerships. 2003–2007.

International Institute for Applied Systems Analysis, Research Scholar. June – August 2003.

*Towson University.* Summer Research Stipend. 2003.

*Towson University.* Proposal Preparation Grant. 2002*.*

*Oak Ridge Institute for Science and Education.* Postgraduate Research Program. 2000.

*United States Environmental Protection Agency.* National Network for Environmental Management Studies Fellowship. 1995–1997.

*National Science Foundation*. International Institute for Applied Systems Analysis, YSSP program. 1997.

*University of Georgia*. Franklin College Doctoral Dissertation Fellowship. 1997–1998.

*The Ohio State University.* University Fellowship. 1990–1991.

Honors

**Excellence in Scholarship Award**, Fisher College of Science and Mathematics, Towson University. 2023.

**Regents Award for Outstanding Scholarship**. University System of Maryland. 2022.

**Fulbright Distinguished Chair in Sustainability**. Masaryk University, Brno, Czech Republic. Fall 2019.

**Keynote presentation**. International Conference on Energy, Ecology and Environment. Stavanger, Norway. 23–26 July 2019.

**Keynote presentation**. International Society for Ecological Modelling. Biennial Global Conference. Jeju, Korea. 18 – 21 September 2017.

**Prigogine Medal 2016**.The Medal is awarded annually by the University of Siena and the Wessex Institute of Technology to a leading scientist in the field of ecological systems. Alicante, Spain, July 2016.

**Invited Panelist**. New Vienna Congress Lab: Towards a new European narrative. Vienna, Austria, 7 – 9 April, 2016

**Keynote Speaker**. Community Surface Dynamic Modeling System Annual Conference. Boulder, Colorado, USA. 26–27, 2015.

**Keynote Speaker**. 9th Biennial conference on Advances in Energy Studies. Stockholm, Sweden. 4–7 May, 2015.

**Keynote Speaker.** 4th Viennese Talks on Resilience and Networks: The Austrian Road to Resilience, Vienna, Austria. 28 January 2015.

**Invited Presentation**. Southern African–Young Scientists Summer Program, University of Free State, Bloemfontein, South Africa. 21, January 2015.

**Invited Presentation.** Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. Beijing, China. 7 January, 2015.

**Keynote Speaker**. 9th International Conference on Ecological Informatics. 20–24, October 2014, Nanjing China.

**Keynote Speaker**. International Workshop on Urban Eco-Complex Modelling. State Key Lab for Urban and Regional Ecology, Chinese Academy of Sciences, Beijing China. 19 March 2014.

**Invited Presentation.** College of Global Change and Earth Systems Science, Beijing Normal University, Beijing China. 18 March 2014.

**Keynote Speaker**. International Conference on Environmental Biology and Ecological Modelling. Santiniketan, India. 24–26 February 2014.

**Invited Presentation.** SA-YSSP. University of Free State. Bloemfontein, South Africa. 3 January 2014.

**Keynote Speaker**. International Society for Ecological Modelling, 28 – 31 October 2013. Toulouse, France.

**Keynote Speaker**. ECSA 53: Estuaries and coastal areas in times of intense change, 13–17 October 2013. Shanghai, China.

**Invited Presentation**. Dept. of Ecological Sciences Tsinghua University, Beijing, China, 29 May 2013.

**Keynote Speaker**. International Workshop on Ecological Integration to Meet the Challenge of Fast Urbanization, Chinese Academy of Sciences, Beijing, China, 26 – 27 May 2013.

**Guest Professor Appointment 2013–2016**, State Key Laboratory of Urban and Regional Ecology, Chinese Academy of Sciences, Beijing, China.

**Keynote Speaker**. International Conference on Hydropedology. Leipzig, Germany. 23 July, 2012.

**Fulbright Distinguished Chair in Environmental Sciences**, Parthenope University, Naples, Italy. Jan--May 2012.

**Keynote Speaker**. International Society of Ecological Modelling Conference. 20 September 2011.

**Regents Award for Outstanding Scholarship**. University System of Maryland. 2011.

**Deputy Director 2010–2012**, Beijing Development Center, Low Carbon Research Center, Beijing, China.

State of Maryland Proclamation from Governor O’Malley for participation in Scientific and Technical Working Group of Maryland Commission on Climate Change. 30 September 2009.

**Guest Professor 2009–2014**, School of Environment, Beijing Normal University, Beijing, China.

**Excellence in Scholarship Award**, Fisher College of Science and Mathematics, Towson University. 2005.

**Early Career Research Excellence Award** (natural systems) from International Environmental Modelling and Software Society. 2004.

Co-author **best student paper**. 1999. Georgia Water Resources Conference.

**Best student paper**. 1996. Institute of Ecology. University of Georgia. Graduate student symposium.

**Outstanding Graduate Teaching Assistant Award Finalist**. 1996. Institute of Ecology. University of Georgia.

**Sigma Xi**. University Graduate Fellowship. Ohio State University.

Miami University. **Phi Beta Kappa**. University Honors. Departmental Honors in Physics and Aeronautics. Sigma Pi Simga. Alpha Lambda Delta/Phi Eta Sigma. Miami University Marching Band percussion section leader.

Professional Service

*Current:*

Conference co-Chair International Society for Ecological Modelling Global, biennial meeting, May 2023, Toronto, Canada.

Conference Co-Chair, The 2nd World Conference on Scholarly Publishing 2023, Theme: "Publishing in an Uncertain Age: Disparity in Scholarly Publishing". May 19–20, 2023.

Founding Editor in Chief *Frontiers in Sustainable Resource Management*.

Conference advisory committee, EcoSummit 2023, June 2023, Gold Coast, Australia.

Jørgensen Research and Review editor, *Ecological Modelling* Journal

Open Modelling Foundation, founding advisory committee.

Secretary General, International Society for Ecological Modelling. 2017–present (former President, North American Chapter of ISEM 2006–2017).

Baltimore County Commission on Environmental Quality (CEQ). 2005–present, Chair 2010–2015; 2021–2022).

Editor in Chief, Current Research in Environmental Sustainability. 2019–2022.

Editor-in-Chief, Ecological Modelling Journal. 2009–2020.

Subject Editor, One Ecosystem. 2018–present.

Editorial Board, energies. 2018–present.

Editorial Board, Land. 2020–present.

Editorial Board, Global Transitions. 2018–present.

Editorial Board, Ecological Indicators. 2015–present.

Editorial Board, Environmental Accounting and Management. 2012–present.

Editorial Board, *Current Research in Environmental Sustainability.* 2019–present.

Editorial Board, Chinese Journal of Population, Resources and Environment

Editorial Board, The Scientific World Journal. 2001–present.

Editorial Board, International Journal of Ecodynamics. 2004–present.

Editorial Board, Ecological Complexity. 2011–2018.

Editorial Board, Ecological Informatics. 2011–2018.

Founding Editor in Chief, *Current Research in Environmental Sustainability*. 2019–2022.

Section Editor, Global Change and Climate, Encyclopedia of Global Environmental Pollution, Springer.

Board of Directors, International Environmental Modelling and Software Society. 2004–2012.

Editor-in-Chief, Handbook of Environmental Management. Taylor and Francis. 2016 – 2021.

Book series editor, *Developments in Environmental Modelling*. 2016–2022.

Book Series Editor: Sustainability Science. Elsevier.

IIASA, YSSP Scientific coordinator 2011–present; DYN/ASA-representative 2008–2017.

Journal Reviewer for Ecological Modelling, Ecological Indicators, Ecological Complexity, Journal of Theoretical Biology, Environmental Modelling and Software, Journal of Environmental Management, Int. J. of Design & Nature and Ecodynamcis, Acta Biotheoretica, Acta Oecologica, Energy, Industrial & Engineering Chemistry Research, EcoHealth, Journal of Industrial Ecology, Energy Conservation and Management, Entropy, Nature Knowledge Project, Landscape and Urban Planning, Landscape Ecology. Biodiversity and Conservation, Biosciences, PloSOne, Ecosphere, Sustainable Cities.

Proposal reviewer for U.S. EPA, U.S. National Science Foundation, European Science Foundation, South African National Research Foundation, Shota Rustaveli National Science Foundation of Georgia, Slovenian Research Agency (ARRS)

*Past conference chair:*

Co-Chair, Ecosystem Dynamics, Focus Research Group, Community Surface Dynamics Modelling System. 2015–2021.

Co-Chair, Resilience Conference. Vienna, Austria. April 7, 2021.

Scientific Committee, International Society for Ecological Modelling Global Conference 2019. Salzburg, Austria 17 – 20 September 2019.

Co-Chair, Resilience Conference. Vienna, Austria. May 22, 2017.

Scientific Committee, International Society for Ecological Modelling Global Conference 2017. Jeju, Korea. 17 – 21 September 2017

Advisory Committee, EcoSummit 2016: Engineering Change, Montpellier, France, 29 Aug – 2 Sept 2016.

Chair, International Society for Ecological Modelling Global Conference, Towson, Maryland. 8–12 May 2016.

Scientific advisory committee, vice chair. 8th European Conference on Ecological Modelling. Marrakech, Morocco. 27–30 October 2014.

International Advisory Committee. International Conference on Environmental Biology and Ecological Modelling (ICEBEM–2014). Visva-Bharati University, Santiniketan, India, 24-26 February, 2014.

Organizing Committee, Int. Society for Ecological Modelling Conference, Toulouse, France Oct 2013.

Co-organizer 3rd Viennese Talks on Resilience Networks, Vienna, Austria, June 2013.

Co-organizer, Systems Ecology: A Network Perspective and Retrospective, Odum School of Ecology, University of Georgia, Athens, Georgia. 12 – 14 April 2013.

Scientific Committee, Advances in Energy Studies Workshop, Mumbai, India, October 2012

IIASA Day Committee, IIASA 40th Anniversary Conference: Worlds within reach from science to policy, 24 –26 October 2012.

1. Integrating Models of Socio-Ecological Systems, co-organizer and Rapporteur.
2. Optimal versus Sub-Optimal Solutions, co-organizer and Rapporteur.

Advisory Committee, 4th International EcoSummit: Restoring the planet’s ecosystem services, Columbus, Ohio, 30 Sept – 5 Oct 2012.

Scientific Advisory Committee, International Environmental Modelling and Software Society, Leipzig, Germany 1–5 July 2012.

Scientific Advisory Committee, ECEM 2011, Riva del Garda, Italy.

Scientific Advisory Committee, ISEM 2011, Beijing, China.

Organizing Committee, ECSA 47 Symposium, Integrative tools and methods in assessing ecological quality in estuarine and coastal systems worldwide, Figuiera de Foz, Portugal, September 14–19, 2010.

Organizing Committee, Solutions for Sustaining Natural Capital and Ecosystem Services: Designing Socio-Ecological Institutions, Salzau, Germany. June 8–11, 2010.

Co-Organizer, Viennese Talks on Resilience Research & Networks: New perspectives on growth, development and innovation. Vienna, Austria May 27, 2010.

Organizing Committee, International Society for Ecological Modelling Conference, Quebec City, October 2009.

Scientific and Technical Working Group member, Maryland Climate Change Commission 2007–2008.

Scientific Advisory Committee, 6th European Conf. on Ecological Modelling, Trieste, Italy, 27–30 November 2007.

Scientific Advisory Committee, 6th Int. Conf. on Ecosystems and Sustainable Development, Coimbra, Portugal, 5–7 September 2007.

Advisory Committee, Int. Conf. on Ecological Modelling. Yamaguchi, Japan 28 Aug. – 1 Sept. 2006.

Scientific Advisory Committee, The Sustainable City Conference, Tallinn, Estonia 17–19 July 2006.

Scientific Committee, Summit on Environmental Modelling and Software, International Environmental Modelling and Software Society, Vermont, USA 9–12 July 2006.

Organizer, Workshop: Network on Environmental Application, Laxenburg, Austria 19–20 December 2005.

Associate Editor, Ecological Modelling Journal. 2005–2008.

Editorial Board, Ecological Modelling Journal. 2000–2005.

Baltimore County Sustainability Network. 2008–2011.

Student Research Advisees

Xuxia Li (China). Ph.D. Secondment from Tianjin University. February 2023–February 2024.

Milena Sokolova (Italy). Ph.D. Secondment from Parthenope University, Naples. July–October 2023.

Amy Shurety (United Kingdom). Young Scientists Summer Program, IIASA. June–August 2023.

Anaís Ostroski (Brzail). Young Scientists Summer Program, IIASA. June–August 2023.

Ehsan Pashanejad (Iran). Young Scientists Summer Program, IIASA. June–August 2023.

Kiara Mosquera Benitez (Towson University). Graduate research advisor, Fall 2022–present.

Wei Xie (China). Young Scientists Summer Program, IIASA. June–August 2022.

Gemma Gerber (South Africa). Young Scientists Summer Program, IIASA. June–August 2022.

Graham Hyde (Towson University, Department of Physics). Graduate research advisor, SP22–FA23.

Ayal Alkhateeb (Towson University). Graduate research advisor, SP22–present.

Yingjie Li (USA). Young Scientists Summer Program, IIASA. June–August 2021.

Mario Diaz Munoz (Czech Republic). Masaryk University. Ph.D. Committee. 2020–present.

Bruno Meirelles de Oliveira (Brazil). Sao Paolo University. Ph.D. Committee. 2019–2021.

Alexander Pellegrini (Towson University). Undergraduate research student. Spring 2021.

Taylor Deese (Towson University). Undergraduate research student. Fall 2020.

Arda Bell (Towson University). Undergraduate research student. Fall 2020.

Sarah Marcelli (Towson University). Undergraduate research student. Spring 2020.

Bruno Meirelles de Oliveira (Brazil). Young Scientists Summer Program, IIASA. June–August 2019.

Chenling Fu (China). Young Scientists Summer Program, IIASA. June–August 2019.

Hanspeter Wieland (Austria). Young Scientists Summer Program, IIASA. June–August 2019.

Claire Camberdella (Towson University). Graduate research student, Spring 2019.

Devin Moody (Towson University). Undergraduate research student. Fall 2018.

Morgan Beard (Towson University). Undergraduate research student. Fall 2018.

Shaina Furman (Towson University). Undergraduate research student. Fall 2018.

Brianna Weinman (Towson University). Undergraduate research student. Fall 2018.

Jessica Burnett (USA). Young Scientists Summer Program, IIASA. June–August 2018.

Laura Mononen (Finland). Young Scientists Summer Program, IIASA. June–August 2018.

Nemi Vora (University of Pittsburgh). Ph.D. Committee, Fall 2017–2019.

Meagan Tunon (Towson University). Undergraduate research student. Fall 2017.

Nemi Vora (USA). Young Scientists Summer Program, IIASA. June–August 2017.

Saige Wang (China). Young Scientists Summer Program, IIASA. June–August 2017.

Maisa Nevalainen (Finland). Young Scientists Summer Program. IIASA, June–August 2017.

Haley Molnar (Towson University). Undergraduate research student. Spring 2016.

Kliffi Blackstone (Towson University). Graduate research student. Spring 2016.

Joey Li (Tsinghua University, China). Visiting Ph.D. student. Fall 2015.

Sihuan Yang (China). Young Scientists Summer Program, IIASA. June–August 2015.

Yolanda Lopez (Mexico). Young Scientists Summer Program, IIASA. June–August 2015.

Casey Bartoe (Towson University). Graduate Thesis Advisor. 2015 – 2016.

Megan Cole (Towson University). Graduate Thesis Advisor. 2015 – 2017.

Arnab Banerjee (India) Southern Africa Young Scientists Summer Program. Dec 2014 – February 2015.

Linlin Xia (China) Southern Africa Young Scientists Summer Program. Dec 2014 – February 2015.

Behruz Sadeghi (Isfahan University, Iran). Visiting Ph.D. student. Fall 2014.

Margaret Garcia (USA). Young Scientists Summer Program, IIASA. June–August 2014.

Hongmei Zheng (China). Young Scientists Summer Program, IIASA. June–August 2014.

Danielle Haak (USA). Young Scientists Summer Program, IIASA. June–August 2014.

Kim Biedermann (Towson University). Undergraduate research Student. 2014.

Delin Fang (China). Southern Africa Young Scientists Summer Program. Nov 2013–February 2014

Caroline Stanley (Towson University). Graduate Thesis Advisor. 2012–2014.

Ayla Haig (Towson University). Graduate Thesis Advisor. 2012–2014.

Tiina Häyhä (Finland). Young Scientists Summer Program, IIASA. June–August 2013.

Feng Le (China). Southern Africa Young Scientists Summer Program. Dec 2012–February 2013.

Joyita Mukherjee (India). Southern Africa Young Scientists Summer Program. Dec 2012–February 2013.

Shaoqing Chen (China). Young Scientists Summer Program, IIASA. June–August 2012.

Carly Dean (Towson University). Graduate Thesis Advisor. 2011–2013.

Ashley Anthony (Towson University). Undergraduate Research Student. 2011.

Jing Dai (China). Young Scientists Summer Program, IIASA. June–August 2011.

Huayi Lin (Sweden). Young Scientists Summer Program, IIASA. June–August 2011.

Olli Lehonten (Finland). Young Scientists Summer Program, IIASA. June–August 2010.

Muhammad Amjad (Pakistan). Young Scientists Summer Program, IIASA. June–August 2010.

Catilin White (Towson University). Undergraduate Honors Student. 2011.

Lauren Cutlip. (Towson University). Undergraduate Research Student. 2010.

Meirong Su (Beijing Normal University). Post-doc supervisor. Fall 2009.

Oswaldo Villena (Towson University). Graduate Thesis Advisor. 2008–2010.

Min Hong (China). Young Scientists Summer Program, IIASA. June–August 2009.

Vasilis Dakos (Netherlands). Young Scientists Summer Program, IIASA. June–August 2009.

Christine Kujath (Towson University). Undergraduate research Student. 2009.

Helena Verissimo (University of Coimbra, Portugal). co-Ph.D. advisor. Spring 2010.

Pat Brady (Towson University). Graduate Thesis Advisor. 2007–2008.

James McNerney (USA). Young Scientists Summer Program, IIASA. June–August 2008.

Jung-Chen Huang (USA). Young Scientists Summer Program, IIASA. June–August 2008.

Theresa Black (Towson University). Graduate Thesis Advisor. 2006–2007.

Megan McCormick (Towson University). Undergraduate research Student. 2006.

Bess Caplan (Towson University). Graduate Thesis Advisor. 2005–2006.

Megan Killian (Towson University). Undergraduate research Student. 2004–2006.

Mike Hansen (Towson University). Undergraduate research Student. 2002–2004.

Dan Fiscus (Center for Environmental Science, Appalachian Lab, Frostburg, MD). Ph.D. committee. 2004.

Geir Halnes (Sweden). Young Scientists Summer Program, IIASA. June–August 2005. co-Ph.D. advisor.

Rute Pinto (University of Coimbra, Portugal). Graduate exchange student. Fall 2004. co-M.S. advisor.

Islam Khater (Egypt). Young Scientists Summer Program, IIASA. June–August 2004.

Past Experience

## Research

Deputy Director, Low Carbon Research Center, Beijing Development Area, Beijing, China. 2010–2013.

Visiting faculty, University of Coimbra, Coimbra, Portugal, 1997–2010.

Environmental Scientist. U.S. EPA. 2000–2001*.* Ecologist on interdisciplinary team in Sustainable Environments Branch, applying information theory, ecological goal functions, and biological indicators to **quantify environmental sustainability**.

Post-doctoral Research Fellow. University of Georgia. 1998–2000*. Coordinator and modeler for the Lake Lanier EPA-NSF Water and Watersheds project*. **Responsible for integration of ecological, hydrological, and social sciences** using ecosystem modeling and survey data concerning community values to develop a more effective method of adaptive environmental assessment and management.

Ph.D. University of Georgia. 1994–1998. *Network analysis: Foundations, extensions, and applications of a systems theory of the environment*. **Designed a framework to model large-scale ecological networks** and developed theorems for a qualitative analysis of component interactions.

International Institute of Applied Systems Analysis (IIASA), Laxenburg, Austria. 1997. *Young Scientists Summer Program*. **Developed hydrological model of an agricultural ecosystem** and applied network analysis to quantify the indirect effects.

Ohio Department of Development, Office of Energy Efficiency, Columbus, Ohio. 11/1992–6/1994. *Policy Development Specialist*. Promoted energy efficiency initiatives for the **Ohio Energy Strategy**, helped develop an Ohio Home Energy Rating System, and began **Ohio**’**s greenhouse gas inventory**.

Masters Degree. Ohio State University. 1990–1993. *Trends and projections of fuel energy resources in the republics of the former Soviet Union*. **Modeled energy production trends of fossil fuel resources** for the republics of the former Soviet Union.

NASA Lewis Research Center, Cleveland, Ohio. 1990. *Intern*. **Created initial model to analyze three-dimensional electromagnetic field** around the International Space Station.

Miami University. Oxford, Ohio. 1988–1990. **Physics tutor**.