Benjamin A. Levy, PhD

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Professional Experience

2023-present	Visiting Associate Professor Bowdoin College, Brunswick, ME
2021-present	Quantitative Research Scientist National Oceanic and Atmospheric Administration (NOAA) Northeast Fisheries Science Center, Woods Hole, MA
2020-present	Associate Professor of Mathematics (on sabbatical AY 23/24)
2016-2020	Assistant Professor of Mathematics Fitchburg State University, Fitchburg, MA
2014-2016	Graduate Research Associate National Institute for Mathematical and Biological Synthesis (NIMBioS) University of Tennessee, Knoxville, TN
2010-2014	Graduate Teaching Associate Department of Mathematics University of Tennessee, Knoxville, TN
2008-2010	Math & Science Faculty Departments of Mathematics and Science Rumsey Hall Junior Boarding School, Washington Depot, CT

Education

2016	Ph.D in Mathematics, **University of Tennessee** Thesis: "Modeling Feral Hogs in Great Smoky Mountains National Park" Concentration: Mathematical Ecology Supporting Areas: Numerical Analysis and Differential Equations Advisors: Dr. Suzanne Lenhart and Dr. Charles Collins
2013	M.S. in Mathematics, **University of Tennessee**
2008	B.A. in Mathematics, **Franklin and Marshall College** Minor: Philosophy

Research Interests

Applied Mathematics	Infectious Disease Modeling	Parameter Estimation
Mathematical Biology	Population Modeling	Fisheries Modeling
Statistical Modeling	Distribution Modeling	Undergraduate Research

Publications

In Progress

Levy, B., Legault, C., Brooks, E., and Miller, T. *Modeling Spatial Preferences and Stock Trends of Atlantic Fish Under the Pressures of Climate Change.* In Progress.

Saucedo, O., Prosper, O., **Levy, B.**, Tang, T., Laubmeier, A., and Asik, L. *Impact of Data Structure, Availability and Noise Distribution on Practical and Structural Identifiability of an SEIR Model.* In Progress.

Journal Articles

Welsh, D., Ludlam, P., Downs, E., Gordon, E., Clark, E., **Levy, B.**, Huang, J., and O'Connor, A. *Stream fish community structure across an urban gradient in a northeastern US watershed.* Environmental Biology of Fishes. p. 1-17, (2023)

Edholm, C., **Levy, B.**, Spence, L., Agusto, F., Chirove, F., Chukwu, W., Goldsman, D., Kgosimore, M., and Maposa, M. *A vaccination model for COVID-19 in Gauteng, South Africa.* Infectious Disease Modelling. 7.3: 333-345, (2022).

Levy, B., Windoloski, K., and Ludlam, J. *Matrix and Agent-Based Modeling of Threats to a Diamond-backed Terrapin Population.* Mathematical Biosciences. p.108672, (2021)

Burton, D., Lenhart, S., **Levy, B.**, Edholm, C., Washington, M., Greening, B., White, J., Lungu, E., Chimbola, O., Kgosimore, M., Chirove, F., and Machingauta, H. *A Mathematical Model of Contact Tracing During the 2014-2016 West African Ebola Outbreak.* Mathematics. 9.6: 608-629, (2021)

Levy, B., Lenhart, S., Collins, C., and Stiver, W. *Evidence for Multiple Transmission Routes for Pseudorabies in Wild Hogs.* Springer Series: Mathematics of Planet Earth, Infectious Diseases and our Planet. 37-56 (2021)

Levy, B., Correia, H., Ronoh, M., Chimbola, O., Kgosimore, M., Chirove, F., Abebe, A., Machingauta, H., Lenhart, S., and White, J. *Modeling the Effect of HIV/AIDS Stigma on HIV Infection Dynamics in Kenya.* Bulletin of Mathematical Biology. 83.5: 1-25, (2021)

Edholm, C., **Levy, B.**, Le Fevre, S., Lenhart S., Marijani, T., Yakubu, A., and Nyabadza, F. *A Risk Structured Mathematical Model of Buruli Ulcer Disease in Ghana.* Mathematics of Planet Earth, Springer, Cham: 109-128, (2019).

Levy, B., and A. Odoi. *Exploratory Investigation of Region Level Risk Factors of Ebola Virus Disease in West Africa.* PeerJ 6: e5888, (2018).

Levy, B., Edholm, C., Lenhart, S., Gaoue, O., Kgosimore, M., Lungu, E., Nyabadza, F. and Marijani, T. 2017. *Modeling the Role of Public Health Education in Ebola Virus Disease Outbreaks in Sudan.* Infectious Disease Modelling 2.3: 323-340, (2017).

Levy, B., Collins, C., Lenhart, S. and Stiver, W. *Evaluating Wild Hog Preferences to Guide Control Strategies in the Great Smoky Mountains National Park.* Natural Resource Modeling 30.3: e12132, (2017).

Hujoel, M., Dantzler, A., Parkman, V., Wild, A., **Levy, B.**, Lenhart, S. and Wilkes, R. *Canine Distemper Outbreak Modeled in an Animal Shelter.* Letters in Biomathematics 3.1: 13-28, (2016).

Levy, B., Collins, C., Lenhart, S., Madden, M., Corn, J., Salinas, R. and Stiver, W. *A Metapopulation Model for Feral Hogs in Great Smoky Mountains National Park.* Natural Resource Modeling 29.1: 71-97, (2016).

Journals Refereed

- Mathematics
- Journal of Theoretical Biology
- PLOS One
- SIAM Undergraduate Research Online (SIURO)
- Problems, Resources, and Issues in Mathematics Undergraduate Studies (PRIMUS)
- Frontiers in Ecology and Evolution

Grants

2022 | XSEDE Computing Startup Request
Requested 50,000 core-hours and 500 GB of storage for computational work • Awarded

2020 | NSF U.S.-Africa Collaborative Research Network
Senior personnel on the grant • Requested $250,000 over 3 years • Awarded

Fitchburg State University Special Projects Grant
2020 | Requested research-related course release • Awarded
2019 | Requested research-related course release • Awarded
2017 | Requested $1760 for student support • Awarded

Fitchburg State University Travel Grant
2019 | Awarded $500 towards travel to Malawi in November 2019
2017 | Awarded $300 towards travel to Tanzania in November 2017

American Mathematical Society and Simon's Foundation Early Career Travel Grant
2019 | Requested $4000 for research travel • Denied
2017 | Requested $4000 for research travel • Denied

Marion and Jasper Whiting Foundation Travel Grant
2019 | Requested $2350 for research travel • Denied
2017 | Requested $1650 for research travel • Denied

2018 | PIF Grant to Develop a Quantitative Reasoning Course (Math 1100) and its Co-Req
Awarded $3167 from March-August 2018

2016-2017 | Project NExT Fellowship
Mathematical Association of America

National Institute for Mathematical & Biological Synthesis
2014-2016 | Graduate Research Assistantship
NIMBioS at the University of Tennessee

Press

2020 | Featured in Lowell Sun newspaper article titled "Social separation called our best defense at present"

2020 | Fitchburg State Library's Faculty Spotlight for the Month of February

2020 | Research trip to Malawi was featured in Worcester Telegram& Gazette newspaper article "Fitchburg State student attends forum in Africa"

Teaching Experience

2019	Mathematical Modeling (Fitchburg State)
2018-2022	Methods of Applied Mathematics (Fitchburg State)
2017 & 2021	Operations Research (Fitchburg State)
2018-2020	Linear Algebra (Fitchburg State)
2014-2022	Calculus I (Tennessee & Fitchburg State)
2019 & 2021	Seminar in Mathematics (Fitchburg State)
2014-2022	Precalculus (Tennessee & Fitchburg State)
2016	ACT Preparation (Tennessee)
2011-2012	Mathematical Reasoning (Tennessee)
2010-2011	Algebra I & II (Rumsey Hall)
2008-2010	8^{th} Physical Science (Rumsey Hall)
2008-2010	6^{th} Grade Earth Science (Rumsey Hall)

Undergraduate Mentoring Experience

2022	Davis, C. *A Zoonotic Compartmental Model for Visceral Leishmaniasis Disease* Faculty mentor for senior honors project.
2022	Mathews, K. *A Mathematical View of the Supply and Demand of Product Industries During Covid-19* Faculty mentor for senior honors project.
2019	Foster, M. *Modeling the Role of Stigma on HIV/AIDS Dynamics in Kenya* Matt and I traveled to the Masamu Advanced Study Institute in Blantyre, Malawi.
2019	Melus, E. & Titus, O. *Modeling Contaminants in the Nashua River Watershed* Distribution modeling project started during summer and continued into school year. Work was presented to community and will be included in future publication.
2018	Windoloski, K. *Matrix and Agent Based Modeling of Diamondback Terrapins* Project funded by internal grant and results were published in *Mathematical Biosciences*.
2017	Windoloski, K. & Cochran, A. *Comparing Optimal College Student Budgets* Project started in Operations Research class, completed following semester & presented at undergraduate conference.
2017	Taylor, C. & Ryan, S. *An Optimization Problem to Determine the Flattest 5k at Fitchburg State University* Project started in Operations Research class, completed over the summer & presented at undergraduate conference.
2015	Hujoel, M., Dantzler, A., Parkman, V., & Wild, A. *Canine Distemper Outbreak Modeled in an Animal Shelter* NIMBioS Summer Research Experience for Undergraduates. Resulted in publication.

Invited Presentations

2024 (upcoming) | *A Simulation Study to Analyze the Impact of Climate Change on Fishery-Independent Surveys*, Joint Mathematics Meetings AMS Special Session on Dynamics and Management in Disease or Ecological Models,
San Francisco, CA

2023 | *How might climate change affect indices of abundance? A simulation study starting point.*, Masamu Advanced Study Colloquium,
Held Virtually

2022 | *Modeling Spatial Preferences and Stock Trends of Atlantic Fish Under the Pressures of Climate Change*,
The Christie Lecture at the MAA Northeastern Section Fall Meeting,
Keene, NH

2022 | *A Vaccination Model for COVID-19 in South Africa*,
SIAM Conference on the Life Sciences session on Advances in Epidemiology,
Pittsburgh, PA

2022 | *Using Data to Address the Health Challenges of the Future*,
Fitchburg State Faculty Scholarship Collaborative Research Presentation,
Fitchburg, MA

2022 | *A Vaccination Model for COVID-19 in South Africa*,
Joint Mathematics Meetings Special Session on Dynamics of Infectious Diseases: Ecological Models Across Multiple Scales, Held Remotely

2021 | *Modeling the Effect of HIV/AIDS Stigma on HIV Infection Dynamics in Kenya*,
SAMSA-Masamu Virtual Colloquia Series, Held Remotely

2021 | *Modeling the Effect of HIV/AIDS Stigma on HIV Infection Dynamics in Kenya*,
Joint Mathematics Meetings Special Session on Advances in Modeling the Ecology of Infectious Diseases, Held Remotely

2020 | *An Introduction to Disease Modeling with an Application to the HIV/AIDS in Kenya*,
Ithaca College Mathematics Seminar, Ithaca, NY and Remotely

2020 | *An Introduction to Disease Modeling with an Application to the Ebola Virus Disease*,
Connecticut College Senior Mathematics Seminar, New London, CT

2018 | *A Discrete Data-Driven Pseudorabies Model for Feral Hogs*,
SIAM Conference on Mathematics of Planet Earth Session on One Health: Connecting Humans, Animals, and the Environment, Philadelphia, PA

2018 | *Using Mathematics to Locate Wild Boar in Great Smoky Mountains National Park*,
Pi Mu Epsilon Induction Ceremony, Fitchburg, MA

2018 | *Modeling Behavior Change to Limit an Ebola Outbreak in Sudan*,
Joint Mathematics Meetings AMS Special Session on Mathematics in Natural Resource Modeling, San Diego, CA

2017 | *Modeling Feral Hogs in Great Smoky Mountains National Park to Evaluate Control Efforts and Analyze the Population's Niche*,
Franklin and Marshall College Pi Mu Epsilon Induction Ceremony, Lancaster, PA

2016 | *A Canine Distemper Outbreak Modeled in an Animal Shelter*,
SIAM Conference on Mathematics of Planet Earth Special Session on Data Driven Infectious Disease Models and Applications, Philadelphia, PA

Invited Presentations continued...

2016 | *Modeling Feral Hogs in Great Smoky Mountains National Park to Evaluate Control Efforts and Analyze the Population's Niche,*
Joint Mathematics Meetings AMS Special Session on Mathematics in Natural Resource Modeling, Seattle, WA

2016 | *Modeling Feral Hogs in Great Smoky Mountains National Park to Assess the Importance of a Control Program,*
Society for Mathematical Biology Annual Conference Session on Discrete Population Models with Management Features, Atlanta, GA

2014 | *Modeling as a Means of Informing Management Strategies,*
Mathematics Seminar at Maryville College, Maryville, TN

2014 | *Modeling Feral Hogs in Great Smoky Mountains National Park,*
SIAM Annual Meeting Special Session for Student Research, Chicago, IL

Contributed Presentations

2023 | *How might climate change affect indices of abundance? A simulation study starting point.,*
International Council for the Exploration of the Seas (ICES) Annual Meeting, Bilbao, Spain

2023 | *How might climate change affect indices of abundance? A simulation study starting point.,*
NOAA National Stock Assessment Workshop,
Providence, RI

2023 | *Simulating the impact of climate change on survey indices of abundance.,*
Society for Mathematical Biology (SMB) Virtual Mini-Conference,
Held Virtually

2021 | *Modeling the Effect of HIV/AIDS Stigma on HIV Infection Dynamics in Kenya,*
Fitchburg State University Speaker Series

2020 | *Modeling the Effect of HIV/AIDS Stigma on HIV Infection Dynamics in Kenya,*
Southern Africa Mathematical Sciences Association Annual Conference,
Held Remotely

2019 | *Evaluating Threats to Diamondback Terrapins in a Coastal Carolina Salt Marsh,*
Southern Africa Mathematical Sciences Association Annual Conference,
Blantyre, Malawi

2019 | *Matrix and Agent-Based Modeling of Diamondback Terrapins,*
Spring Development Day, Fitchburg State University, Fitchburg, MA

2018 | *Constructing a Habitat Suitability Model for Wild Boar in Great Smoky Mountains National Park Using Environmental Predictors and Presence Only Data,*
Spring Development Day, Fitchburg State University, Fitchburg, MA

2016 | *Modeling the Role of Education in Limiting a Future Outbreak of Ebola,*
Southern Africa Mathematical Sciences Association Annual Conference, Pretoria, South Africa

2015 | *Modeling Canine Distemper Virus in an Animal Shelter,*
Southern Africa Mathematical Sciences Association Annual Conference. Windhoek, Namibia,

2014 | *Modeling Feral Hogs in Great Smoky Mountains National Park,*
Southern Africa Mathematical Sciences Association Annual Conference, Victoria Falls, Zimbabwe

2014 | *Modeling Feral Hogs in Great Smoky Mountains National Park,*
International Symposium on Biomathematics & Ecology: Education & Research, Harvey Mudd College, Claremont, CA

Poster Presentations

2018 | *Modeling Feral Hogs in Great Smoky Mountains National Park,*
5th Annual Science Symposium., Fitchburg State University Fitchburg, MA

2017 | *Modeling Feral Hogs in Great Smoky Mountains National Park,*
4rd Annual Science Symposium., Fitchburg State University Fitchburg, MA

2018 | *Modeling Feral Hogs in Great Smoky Mountains National Park,*
46th Annual John H. Barrett Memorial Lectures, University of Tennessee, Knoxville, TN

2016 | *Evaluating Multi-Sensory Learning and Relationship Building through STEMpunk: a Reverse Science Fair,*
Women in STEM Research Symposium., University of Tennessee Knoxville, TN

2015 | *Modeling Feral Hogs in Great Smoky Mountains National Park,*
Mathematics of Planet Earth Workshop on Education for the Planet Earth of Tomorrow, NIMBioS, Knoxville, TN

2015 | *Modeling Feral Hogs in Great Smoky Mountains National Park,*
Mathematics of Planet Earth Workshop on Management of Natural Resources, Howard University, Washington D.C.

Additional Conferences Attended

2023 | Joint Mathematics Meeting. Boston, MA

2020-21 | Society for Mathematical Biology Annual Meeting. Held remotely

2017 | Southern Africa Mathematical Sciences Annual Meeting, Arusha, Tanzania

2017 | Mathematical Association of America's MathFest, Chicago, IL

2017 | Massachusetts Project Kaleidoscope Regional Summer Meeting, Fitchburg MA

2017 | Joint Mathematics Meeting, Atlanta, Georgia

2016 | Mathematical Association of America's MathFest, Columbus, OH

2015 | MAA Southeastern Section Meeting. University of North Carolina, Wilmington, NC

2014 | AMS Sectional Meeting, University of Tennessee, Knoxville, TN

2013 | Southeast-Atlantic Regional Conference on Differential Equations, Knoxville, TN

2013 | Resource Modeling Association Annual Meeting, Cornell University, Ithaca, NY

Service to the Discipline

2020 | Judge for *Undergraduate Challenge Using Differential Equations Modeling Challenge*
SIMIODE, Held remotely

2019 | Co-Organizer of *STEM Workshop for high school teachers*
SAMSA Annual Conference, Blantyre, Malawi

2019 | Local Organizing Committee for *MAA Northeast Section Meeting*
Mathematical Association of America, Fitchburg, MA

2017 | Presenter in *STEM Workshop for high school teachers*
SAMSA Annual Conference, Arusha, Tanzania

2017 | Co-organizer of a panel session titled *Where are the math majors? Broadening scope by increasing mathematics enrollment*
Mathematical Association of America's MathFest, Chicago, IL

Awards

2016 | Graduate Student Achievement Award
Department of Mathematics, University of Tennessee

2015 | SIAM Award for Effort and Achievement
Society for Industrial & Applied Mathematics

2013 | Dorothea & Edgar D. Eaves Teaching Award
Department of Mathematics, University of Tennessee

Professional Societies

- American Mathematical Society (AMS)
- Society for Mathematical Biology (SMB)
- Mathematical Association of America (MAA)
- Society for Industrial and Applied Mathematics (SIAM)
- Southern Africa Mathematical Sciences Association (SAMSA)

Workshops and Certificate Programs

2020-Present	*The Faculty Academy*- Training to reach students at-risk, Fitchburg State University, Facilitated by Dr. Paul Hernandez
2020-Present	*Dynamics of Infectious Diseases: Ecological Models Across Multiple Scales*, AMS Mathematics Research Community, Held remotely
	Masamu Advanced Study Institute Workshop in Mathematical Sciences,
2021	Held remotely
2020	Held remotely
2019	Blantyre, Malawi
2017	Arusha, Tanzania
2016	Pretoria, South Africa
2015	Windhoek, Namibia
2014	Victoria Falls, Zimbabwe
2020	*Workshop on Mathematical Models in Understanding COVID-19*, Institute for Pure and Applied Mathematics at UCLA, Held Remotely
2018	*Applications of Spatial Ecology: Ecological Niche Modeling*, NIMBioS at the University of Tennessee, Knoxville, TN
2016-2017	*Project NExT Fellowship*, Mathematical Association of America, Various Locations
2017	*Course Redesign Workshop*, Center for Teaching and Learning at Fitchburg State University, Fitchburg, MA
2011-2016	*Teaching Certificate Program*, Department of Mathematics, University of Tennessee, Knoxville, TN
2015	*Mathematics of Planet Earth Workshop on Education for the Planet Earth of Tomorrow*, National Institute for Mathematical & Biological Synthesis, Knoxville, TN
2015	*Mathematics of Planet Earth Workshop on Management of Natural Resources*, Howard University, Washington, D.C.
2017	*Modeling the Spread & Control of Ebola in West Africa - A Rapid Response Workshop*, Georgia Institute of Technology, Atlanta, GA
2014	*Best Practices in Teaching Certificate Program*, The Graduate School, University of Tennessee, Knoxville, TN
2014	*Industrial Mathematical / Statistical Modeling Workshop*, Statistical & Applied Mathematical Sciences Institute, NCSU, Raleigh, NC
2014	*Parameter Estimation for Dynamic Biological Models Workshop*, National Institute for Mathematical & Biological Synthesis, Knoxville, TN

University Service and Outreach

FSU = Fitchburg State University UT = University of Tennessee

2021-present	Center for Teaching and Learning New Faculty Mentor (FSU)
2017-present	Center for Faculty Scholarship Advisory Board (FSU)
2017-present	Faculty advisor for Fitchburg State University Chess Club (FSU)
2017-present	Crocker Center for Community Scholarship group member (FSU)
2016-present	Mathematics Department Seminar Committee (FSU)
2016-present	Elizabeth Haskins Mathematics Competition Committee (FSU)
2020-2021	First Year Experience (FYE) Committee (FSU)
2020	Falcons Supporting Falcons Initiative Spring and Fall 2020 (FSU)
2019-2020	Co-Organizer for *Undergraduate Conference on Research and Creative Practices* (FSU)
2018-2019	Search committee for Tenure-Track Position in Mathematics (FSU)
2018-2019	Created textbook and course material for QR course *Math in Society* (FSU)
2017-2019	Living and Learning Community Facilitator (FSU)
2016-2017	Interdisciplinary STEM Major Formation Committee (FSU)
2016-2017	Pi Mu Epsilon and Math Club Advisor (FSU)
2016-2017	All University Policies Committee (FSU)
2013-2016	Student chapter for the Society for Industrial and Applied Mathematics (UT) President (2014-2016) and Treasurer (2013-2014)
2015	Coordinator for *STEMPunk Reverse Science Fair* (UT)
2010-2015	High school math contest official (UT)
2014 & 2015	Math assistant for *Adventures in STEM Day Camp* (UT)
2014	Middle School Mathematics Ambassador (UT)
2013-2014	Graduate student peer teaching mentor (UT)