

Curriculum Vitae

Name: Yun Kang
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Education:

Arizona State University	Mathematics (mathematical biology)	PhD	2008
University of Arizona	Mathematics (random graphs)	M.S.	2004
Shanghai Jiaotong University, China	Financial and Computational Mathematics	B.S.	2002

Affiliation and Employment:

2019– Professor, Science and Mathematics Faculty,
College of Integrative Sciences and Arts, Arizona State University

2016–2019 Acting Director/Co-Director,
Simon A Levin Mathematical, Computational & Modeling Sciences Center,
Arizona State University

2014–Present Associate Professor, Science and Mathematics Faculty,
College of Integrative Sciences and Arts, Arizona State University

2013–2014 Assistant Professor, Science and Mathematics Faculty,
College of Letters and Sciences, Arizona State University

2008–2012 Assistant Professor, Applied Sciences and Mathematics,
College of Technology & Innovation, Arizona State University

2008–Present Core Faculty,
Simon A Levin Mathematical, Computational & Modeling Sciences Center,
Arizona State University

2008–Present Affiliated Faculty, School of Mathematical and Statistical Sciences,
Arizona State University

Research Interests:

My main areas of study are Dynamical Systems and Mathematical Biology. My research interests have both theoretical and modeling components:

- Nonlinear dynamical systems (ODEs, Difference Equations, PDEs, DDEs, Integro-Difference Equations, and Stochastic Differential Equations).
- Mathematical biology (Population Dynamics, Food-web Structures, Spatial Ecology).
- Modeling in epidemiology, eco-epidemiology, and social insect colonies as complex adaptive systems.

I. Research and Scholarly Activities

I.A. Publications/Manuscripts: *Underline* indicates the corresponding author; ^s indicates post-doctoral and/or international scholars under my supervising; * indicates graduate student; and ** indicates undergraduate student. Publications involving international research collaborations are indicated with superscript ⁱ. Order of authorship: Students are first authors provided that they carried out the majority of the model develop and the related analysis. The mentor/senior author/s is listed last in general. The ‘sandwiched’ authors are sorted in descending order based on practical and intellectual contributions to designing and performing experiments, analyzing/providing data, and to developing the publications. My contributions have been provided at the end of each publication.

I.A.1-Published in peer-reviewed international high impact journals:

1. Tao Feng^{*s}, Zhipeng Qiu, and **Yun Kang**, 2021. Foraging and recruitment dynamics of social insect colonies. Accepted in *SIAM Journal on Applied Mathematics*.
2. ⁱ Ozgur Aydogmus and **Yun Kang**, 2021. Analysis of stationary patterns arising from a time-discrete metapopulation model with nonlocal competition. Accepted in *Discrete and Continuous Dynamical Systems-B.v*
3. Tao Feng^{*s}, Dan Charbonneau, Zhipeng Qiu, and **Yun Kang**, 2021. Dynamics of task allocation in social insect colonies: Scaling effects of colony size versus work activities. *Journal of Mathematical Biology*. In press.
4. Angela Peace, **Yun Kang**, and many others, 2021. Stoichiometric ecotoxicology for a multi-substance world. *BioScience*, **71**(2), Pages 132-147, <https://doi.org/10.1093/biosci/biaa160>
5. ⁱCongbo Xie, Meng Fan, and **Yun Kang**, 2021. Population dynamics of the giant Jellyfish *Nemopilema nomurai* with age structure. *Ecological Modelling*, **441**, 109412.
6. Komi Messan, Marisabel Rodriguez Messan, Jun Chen*, Gloria DeGrandi-Hoffman, and **Yun Kang**, 2021. Population dynamics of Varroa mite and honeybee: Effects of parasitism with age structure and seasonality. *Ecological Modeling*, **440**, 109359.
7. Pankaj Tiwariⁱ, **Yun Kang**, and Samares Pal, 2021. A nonautonomous model for the interactive effects of fear, refuge and additional food in a prey-predator system. *Journal of Biological Systems*, 1-39.
8. Dingyong Baiⁱ, **Yun Kang**, Shigui Ruan, and Lisha Wang^{*s}, 2021. Dynamics of an Intraguild Predation (IGP) food web model with strong Allee effect in the basal prey, *Nonlinear Analysis: Real World Applications*, **58**, 103206.
9. Akhil Kumar Srivastav,* ⁱPankaj Kumar Tiwari, Prashant K Srivastava, Mini Ghosh, and **Yun Kang**, 2021. A mathematical model for the impacts of face mask, hospitalization and quarantine on the dynamics of COVID-19 in India: deterministic vs. stochastic. *Mathematical Biosciences and Engineering*, **18**(1), 182-213.

10. Lei Zhang^{*s}, Maoxing Liu, Qiang Hou, Asma Azizi^s, and **Yun Kang**, 2021. Dynamics of an SIS model on network with a periodic infection. *Applied Mathematical Modelling*, **89**, 907-918.
11. Pankaj Tiwariⁱ, Rajesh Singh, Subhas Khajanchi, **Yun Kang** and Arvind Misra, 2021. A mathematical model to restore water quality in urban lakes using Phoslock, *Discrete and Continuous Dynamical Systems-B*, **26** (6), 3143. doi: 10.3934/dcdsb.2020223
12. Gloria DeGrandi-Hoffman, Vanessa Corby-Harris, Yanping Chen, Henry Graham, Mona Chambers, Emily Watkins deJong, Nicholas Ziolkowski, **Yun Kang**, Stephanie Gage, Megan Deeter, Michael Simone-Finstrom, and Lilia de Guzman, 2020. Can supplementary pollen feeding reduce varroa mite and virus levels and improve honey bee colony survival? *Experimental and Applied Acarology*, **82**(4), 455-473.
13. Rajanish Kumar Raiⁱ, Pankaj Kumar Tiwariⁱ, **Yun Kang**, and Arvind Kumar Misra, 2020. Modeling the effect of literacy and social media advertisements on the dynamics of infectious diseases, *Mathematical Biosciences and Engineering*, **17**(5), 5812-5848
14. Jai Prakash Tripathiⁱ, Sarita Bugalia, Vandana Tiwari, and **Yun Kang**, 2020. A predator-prey model with a Crowley-Martin functional response: a non-autonomous study. *Natural Resource Modeling*, **33**(4), e12287
15. Feng Raoⁱ, Junling Luo^{*}, Zhongliang Zhang^{*}, and **Y Kang**, 2020. Spatiotemporal dynamics of a predation system with time delay and spatial diffusion. *Journal of Statistical Mechanics: Theory and Experiment*, **10**, 103501.
16. Yongli Cai, Jiaxu Li, **Yun Kang**, Kai Wang, and Weiming Wang, 2020. The fluctuation impact of human mobility on the influenza transmission, *Journal of the Franklin Institute*. **357**(13), 8899-8924
17. ⁱFeng Rao^s, Marisabel Rodriguez Messan, Angelica Marquez^{**}, Nathan Smith^{*}, and **Yun Kang**, 2020. Nutritional regulation influencing colony dynamics and task allocation in social insect colonies, *Journal of Biological Dynamics*. <https://doi.org/10.1080/17513758.2020.1786859>
18. Jun Chen^{*}, Komi Messan, Marisabel Rodriguez Messan, Gloria DeGrandi-Hoffman, Dingyong Bai, and **Yun Kang**, 2020. How to model honeybee population dynamics: stage structure and seasonality. *Mathematics in Applied Sciences and Engineering*, Online First, pp.1-34. <http://www.uwo.ca/lib/mase>
19. Anupam Khatua, Tapan Kumar Kar, Swapan Kumar Nandi, Soovoojeet Jana, and **Yun Kang**, 2020. Impact of human mobility on the transmission dynamics of infectious diseases. *Energy, Ecology and Environment*. <https://doi.org/10.1007/s40974-020-00164-4>
20. Guo Xiaohui^{*}, Jun Chen^{*}, Jennifer Fewell, and **Yun Kang**, 2020. Dynamics of social interactions, in the flow of information and disease spreading in social insects colonies: Effects of environmental events and spatial heterogeneity. *Journal of Theoretical Biology*, **492**, 110191.
21. ⁱDingyong Bai, Wenrui Zeng, Jiachun Wu, and **Yun Kang**, 2020. Dynamics of a non-autonomous biocontrol model on native consumer, biocontrol agent and their predator. *Non-linear Analysis: Real World Applications*, **55**, 103-136.

22. Arvind Kumar Misra*, Rajesh Kumar Singh, Pankaj Kumar Tiwari, Subhas Khajanchi, and **Yun Kang**, 2020. Dynamics of algae blooming: effects of budget allocation and time delay. *Nonlinear Dynamics*, **100**, pages1779-1807.
23. ⁱDingyong Bai, Meng Fan, Jianshe Yu, and **Yun Kang**, 2020. Dynamics for a non-autonomous predator-prey system with generalist predator. *Journal of Mathematical Analysis and Applications*, **485**(2), 123820. doi.org/10.1016/j.jmaa.2019.123820
24. ⁱYufang Wang^s, Kai Xu, **Yun Kang**, Haiyan Wang, Feng Wang, and Adrian Avram, 2020. Regional influenza prediction with sampling twitter data and PDE model. *International journal of environmental research and public health*, **17** (3), 678. doi.org/10.3390/ijerph17030678
25. A. Azizi^s, C. Montalvo*, B. Espinoza, **Yun Kang**, and C. Castillo-Chavez, 2020. Epidemics on networks: Reducing disease transmission using health emergency declarations and peer communication. *Infectious Disease Modelling*, **5**, 12-22.
26. ⁱSaswati Biswas*, ⁱPankaj Kumar Tiwari, **Yun Kang**, and Samares Pal, 2020. Effects of zooplankton selectivity on phytoplankton in an ecosystem affected by free-viruses and environmental toxins. *Mathematical Biosciences and Engineering*, **17**(2): 1272-1317. doi: 10.3934/mbe.2020065
27. ⁱDingyong Bai, Jianshe Yu, and **Yun Kang**, 2019. Spatiotemporal dynamics of a diffusive predator-prey model with generalist predator. *Discrete & Continuous Dynamical Systems-S*. doi: 10.3934/dcdss.2020132
28. ⁱYufang Wang, X. Wang, S. Chang, and **Yun Kang**, 2019. Product innovation and process innovation in a dynamic Stackelberg game. *Computers & Industrial Engineering*, **130**, 395-403.
29. ⁱFeng Rao^s, Partha S Mandal, and **Yun Kang**, 2019. Complicated endemics of an SIR model with a generalized incidence under preventive vaccination and treatment controls. *Applied Mathematical Modelling*, **67**, 38-61.
30. Marisabel Rodriguez*, Robert E. Page Jr., and **Yun Kang**, 2018. Population and vitellogenin dynamics of a honeybee colony influencing division of labor. *Ecological Modeling*, **388**, 88-107.
31. Feng Rao^s, Carlos Castillo-Chavez, and **Yun Kang**, 2018. Dynamics of a stochastic delayed Harrison-type predation model: Effects of delay and stochastic components. *Mathematical Biosciences and Engineering*, **15**(6), 1401-1423.
32. Marisabel Rodriguez*, Darin Kopp*, Daniel Allen, and **Yun Kang**, 2018. Dynamical implications of bi-directional resources exchange within a meta-ecosystem. *Mathematical Biosciences*, **301**, 167-184.
33. Marisabel Rodriguez*, Nathan Smith*, Tin Phan**, Jonathan Woodbury**, and **Yun Kang**, 2018. Interactions between leaf-cutter ants and fungus garden: Effects of division of labor, age polyethism, and egg cannibalism. *Mathematical Modelling of Natural Phenomena*, **13**(3), article number 30, 32 pages.

34. Sherry Towers, Jun Chen*, Carlos Cruz*, Juan Melendez-Alvarez*, Jennifer Rodriguez*, Armando Salinas*, Fan Yu*, and **Yun Kang**, 2018. Quantifying the relative effects of environmental and direct transmission of norovirus. *Royal Society Open Science*, **5**: 170602.
35. Feng Rao^s, Carlos Castillo-Chavez, and **Yun Kang**, 2018. Dynamics of a diffusion reaction prey-predator model with delay in prey: Effects of delay and spatial components. *Journal of Mathematical Analysis and Applications*, **461**(2),1177-1214.
36. ⁱ Yongli Cai, **Yun Kang**, Malay Banerjee, and Weiming Wang, 2017. Complex Dynamics of a host-parasite model with both horizontal and vertical transmissions in a spatial heterogeneous environment. *Nonlinear Analysis: Real World Applications*, **40**, 444-465.
37. **Yun Kang**, Dingyong Bai^s, Lorenzo Tapia*, and Heather Bateman, 2017. Dynamical effects of biocontrol on the ecosystem: Benefits or Harm? *Journal of Applied Mathematical Modelling*, **51**, 361-385.
38. Komi Messan*, Gloria DeGrandi-Hoffman, Carlos Castillo-Chavez and **Yun Kang**, 2017. Migration effects on population dynamics of the honeybee-mite interactions. The special thematic issue on "Eco-Epidemiology" in *Mathematical Modeling of Natural Phenomena*, **12** (2), 84-115.
39. Riley Burnette*, H.L. Bateman, and **Yun Kang**, 2017. Seasonality and land cover type drive aphid dynamics in an arid city. *Journal of Arid Environments*, **144**, 12-20.
40. ⁱ Ozgur Aydogmus^s, **Yun Kang**, Musa Kavgaci, and Huseyin Bereketoglu, 2017. Dynamical effects of nonlocal interactions in discrete-time analogs of nonlocal Fisher equation. *Ecological Complexity*, **31**, 88-95.
41. ⁱ Yongli Cai^s, **Yun Kang**, and Weiming Wang, 2017. A stochastic differential equation SIRS epidemic model with ratio-dependent incidence rate. *Journal of Applied Mathematics and Computation*, **305**(C), 221-240.
42. **Yun Kang**, Sourav Kumar Sasmal*, and Komi Messan*, 2017. A two-patch prey-predator model with dispersal in predator driven by the strength of predation. *Mathematical Biosciences and Engineering*, **14**(4), 843-880.
43. ⁱ Ozgur Aydogmus^s, Wen Zhou, and **Yun Kang**, 2017. Evolution cooperation of two-strategy games with non-local interactions, *Mathematical Biosciences*, **285**, 25-42.
44. Komi Messan* and **Yun Kang**, 2017. A two patch prey-predator model with multiple foraging strategies in predators, *Discrete and Continuous Dynamical Systems-B*, **22**(3), 947-976.
45. ⁱYongli Cai^s, **Yun Kang**, and Weiming Wang, 2017. Global threshold dynamics of a reaction-diffusion epidemic model incorporating intervention strategies. The special issue on Current Topics in Mathematical Biology of *Mathematical Biosciences and Engineering*, **14**(5&6), 1071-1089.
46. Marisabel Rodriguez* and **Yun Kang**, 2016. Colony and evolutionary dynamics of a two-stage model with brood cannibalism and division of labor in social insects, *Natural Resource Modeling*, **29**(4), 633-662.

47. ⁱ Feng Rao^s and **Yun Kang**, 2016. The complex dynamics of a diffusive prey-predator model with an Allee effect in prey, *Ecological Complexity*, **28**, 123-144.
48. Martin Helmkampf, Sasha Mikheyev, **Yun Kang**, Jennifer Fewell and Jurgen Gadau, 2016. Gene expression and variation in social aggression in the harvester ant *Pogonomyrmex californicus*. *Molecular Ecology*, **25**(15), 3716-3730.
49. **Yun Kang** and Guy Theraulaz, 2016. Dynamical models of task organization in social insect colonies. *Bulletin of Mathematical Biology*, **87** (5), 879-915.
50. **Yun Kang**, Krystal Blanco*, Talia Davies**, Ying Wang and Gloria DeGrandi-Hoffman, 2016. Disease dynamics of Honeybees with Varroa destructor as parasite and virus vectors. *Mathematical Biosciences*, **275**, 71-92.
51. ⁱ Dongyu Lv, Meng Fan, **Yun Kang** and Krystal Blanco*, 2016. Modeling refuge effect of submerged macrophytes in Lake System. *Bulletin of Mathematical Biology*, **78**(4), 662-694.
52. **Yun Kang**, 2016. Dynamics of a generalized Ricker-Beverton-Holt competition model subject to Allee effects. *Journal of Difference Equations and Applications*, **22**(5), 687-723.
53. ⁱ Yongli Cai^s, **Yun Kang**, Malay Banerjee and Weiming Wang, 2015. A stochastic epidemic model incorporating media coverage, *Communications in Mathematical Sciences*, **14**(4), 893-910.
54. Derdei Bichara^s, **Yun Kang**, Carlos Castillo-Chavez, Richard Horan, and Charles Perrings, 2015. *SIS* and *SIR* epidemic models under virtual dispersal. *Bulletin of Mathematical Biology*. 77, 2004-2034.
55. ⁱ Yongli Cai*, **Yun Kang**, Malay Banerjee, and Weiming Wang, 2015. A stochastic SIRS epidemic model with infection force under intervention strategies. *Journal of Differential Equations*, **259**, 7463-7502.
56. Sourav Kumar Sasmal*, **Yun Kang**, and Joydev Chattopadhyay, 2015. Intra-specific competition in predator can promote the coexistence of an eco-epidemiological model with strong Allee effects in prey. *Journal of BioSystems*, 137, 34-44.
57. **Yun Kang** and Jennifer Fewell, 2015. Coevolutionary dynamics of a social parasite-host interaction model: obligatory versus facultative social parasitism. *Natural Resource Modeling*, **28**(4), 398-455.
58. **Yun Kang**, Marisabel Rodriguez* and Stephen Evilsizer*, 2015. Ecological and evolutionary dynamics of a two-stage social insect model with egg cannibalism. *Journal of Mathematical Analysis and Applications*, **430**(1), 324-353.
59. Margaret-Rose Leung**, Dustin Padilla*, Baojun Song, **Yun Kang**, Noah Shemer** and Juan Vinagera**, 2015. A Symmetric Intraguild Predation Model for the Invasive Lionfish and Native Grouper. *Communications in Mathematical Biology and Neurosciences*. 2015:24
60. Peng Feng and **Yun Kang**, 2015. Dynamics of a modified Leslie-Gower model with double Allee effects. *Nonlinear Dynamics*, **80**, 1051-1062.

61. Oyida Udiani*, Noa Pinter-Wollan and **Yun Kang**, 2015. Identifying robustness in the regulation of foraging of ant colonies using an interaction based model with backward bifurcation. *Journal of Theoretical Biology*, **365**, 61-75.
62. ⁱ **Yun Kang**, Amiya Ranjan Bhowmick*, Sourav Kumar Sasmal* and Joydev Chattopadhyay, 2015. A host-parasitoid system with predation-driven component Allee effects in host population. *Journal of Biological Dynamics*, **9**(sp1), 213-232.
63. ⁱ Yongli Cai*, Malay Banerjee, **Yun Kang** and Weiming Wang, 2014. Spatiotemporal complexity in a predator-prey model with weak Allee effects. *Mathematical Biosciences and Engineering*, **11**(6), 1247-1274.
64. **Yun Kang** and Oyida Udiani*, 2014. Dynamics of a single species evolutionary model with Allee effects, *Journal of Mathematical Analysis and Applications*, **418** (1), 492-515.
65. **Yun Kang** and Carlos Castillo-Chavez, 2014. Dynamics of SI models with Allee effects and vertical transmission in conjunction with horizontal transmission, *Mathematical Biosciences*, **248**, 97-116.
66. **Yun Kang** and Carlos Castillo-Chavez, 2014. A simple epidemiological model for populations in the wild with Allee effects and the disease-modified fitness, *Discrete and Continuous Dynamical Systems-B*, **14** (1), 89-130.
67. **Yun Kang** and Carlos Castillo-Chavez, 2014. Dynamics of a simple two-patch SI models with Allee effects and disease modified fitness. *Second Order Elliptic Equations and Elliptic Systems: Contemporary Mathematics* in honour of Ronald Mickens' 70th birthday. 49-88.
68. **Yun Kang**, Sourav Kumar Sasmal*, Amiya Ranjan Bhowmick* and Joydev Chattopadhyay, 2014. Dynamics of a predator-prey system with prey subject to Allee effects and disease. *Mathematical Biosciences and Engineering*, **11**(4). 89-130.
69. **Yun Kang**, 2013. Permanence of a general discrete two-species interaction model with non-monotone per capita growth rates, *Discrete and Continuous Dynamical Systems-B*, **18**(8), 2123-2142.
70. **Yun Kang**, 2013. Scramble competitions can rescue endangered species subject to strong Allee effects, *Mathematical Biosciences*, **241**(1), 75-87.
71. **Yun Kang** and Lauren Wedekin*, 2013. Dynamics of a intraguild predation model with generalist or specialist predator, *Journal of Mathematical Biology*, **67**(5), 1227-1259.
72. **Yun Kang** and Carlos Castillo-Chavez, 2012. Multiscale analysis of compartment models with dispersal, *Journal of Biological Dynamics*, **6**(2), 50-79.
73. **Yun Kang** and Nicolas Lanchier, 2012. The role of space in the exploitation of resources. *Bulletin of Mathematical Biology*, **74**, 1-44.
74. **Yun Kang** and Hal Smith, 2012. Global dynamics of a discrete two-species Lottery-Ricker competition model, *Journal of Biological Dynamics*, **6**(2), 358-376.

75. **Yun Kang**, 2012. Pre-images of invariant sets of a discrete competition model, *Journal of Difference Equations and Applications*, **18**(10), 1709-1733.
76. **Yun Kang**, Rebecca Clark*, Michael Makiyama** and Jennifer Fewell, 2011. Mathematical modeling on obligate mutualism: Interactions between leaf-cutter ants and their fungus garden, *Journal of Theoretical Biology*, **289**, 116-227.
77. **Yun Kang** and Yakubu Abdul-Aziz, 2011. Dynamics of competition model subject to Allee Effects, *Nonlinear Analysis: Real World Applications*, **12**, 3329-3345.
78. **Yun Kang** and Dieter Armbruster, 2011. Dispersal effects on a discrete two-patch model for plant-insect interactions, *Journal of Theoretical Biology*, **268**, 84-97.
79. **Yun Kang** and Nicolas Lanchier, 2011. Dispersal effect on a deterministic and a stochastic two-patch model with Allee effect, *Journal of Mathematical Biology*, **62**, 925-73.
80. **Yun Kang** and Dieter Armbruster, 2011. Noise and seasonal effects on the dynamics of plant-herbivore models with monotone plant growth functions, *International Journal of Biomathematics*, **4**, 1-20.
81. **Yun Kang** and Peter Chesson, 2010. Relative nonlinearity and permanence, *Theoretical Population Biology*, **78**, 26-35.
82. **Yun Kang**, Dieter Armbruster and Yang Kuang, 2008. Dynamics of a plant-herbivore model, *Journal of Biological Dynamics*, **2**, 89-101.

Recent submissions (preprints):

83. ⁱ Sunmi Lee and **Yun Kang**: Optimal control of a discrete-time plant-herbivore model in fluctuated environments. Preprint.
84. Jun Chen*, Guo Xiaohui*, Soodeh Aziz^s, and **Yun Kang**: Dynamics of social interactions and task switches in social insect colonies with spatial heterogeneity. Preprint.
85. Armando Salinas*, Benjamin Pyenson*, Juergen Liebig and **Yun Kang**: Hierarchy establishment from nonlinear social interactions and metabolic costs: an Application to the *Harpegnathos saltator*. Preprint
86. Oyita Udiani*, **Yun Kang**, and Jennifer Fewell: Group size enhances division of labor but not productivity in forced associations of ant queens. Preprint.
87. ⁱPankaj Kumar Tiwari, Rajesh Kumar Singh, Debaldev Jana, **Yun Kang**, and Arvind Kumar Misra: Modeling the impact of Algae on the abatement of atmospheric carbon dioxide. Under Review.
88. Ying Wang, Osman Kaftanoglu, **Yun Kang**, Laura Creb, Gro Amdam, Robert E. Page, Jr.: TA/TYR1 plays a central role in honey bee (*Apis mellifera*) reproductive physiology and social behavior. Under Review.

89. Lisha Wang^{*s}, Tao Feng, Zhipeng Qiu, and **Yun Kang**: An eco-epidemiological model with social predation subject to a component Allee effect. Under Review.
90. Marisabel Rodriguez*, Stephen Evilsizor*, Feng Rao, Hal Smith and **Yun Kang**: Dynamics of a delayed two-stage model of social insects with egg cannibalism. Preprint

I.B. Awards/Grants:

I.B.1-Funded External Grants:

14. DOD-ARMY: Army Material Command (**Co-PI**, 30%), 09-2020 to 08-2022: *Human-Autonomy Teaming: Capturing Team Effectiveness Factors to Support Feedback and Interventions*, \$512,535.
13. NSF of China (**Co-PI**, 20%), 2020-2023: *The study on the transmission dynamics of infectious diseases based on coevolution network* RMB 63,8000.
12. **Senior Personnel**: 03/01/2018-02/28/2022, **Mathematical & Theoretical Biology Institute Research Experience for Undergraduates**, NSF-REU Sites, \$294,954 (with PI Carlos Castillo-Chavez. My share is estimated as 10%).
11. **PI**: 09/01/2017-08/31/2021, **Mathematical Modeling of Honeybee Populations in Heterogenous Environments: Linking Disease, Parasite, Nutrition, and Behavior**, NSF-Mathematical Biology Program, \$290,436 (Award ID: DMS 1716802, with Co-PI Gloria DeGrandi-Hoffman).
10. **PI**: 09/15/2013-08/31/2018, **Multiscale modeling of division of labor in social insects**, NSF-Mathematical Biology Program, \$289,980 (Award ID: 1313312, with Co-PI Jennifer Fewell and Co-PI Dieter Armbruster).
9. **Co-PI**: 03/12/2018-03/11/2021, **Mathematical & Theoretical Biology Institute Research Experience for Undergraduates**, NSA (DOD)-REUs, \$123,575 (with PI Carlos Castillo-Chavez. My share is estimated as 20%).
8. **Co-PI**: 02/01/2018-08/31/2021, SBIR 2016.2 SB162-005 Phase II-**Managing Emergent Behavior of Interacting Autonomous Systems** (ASC-SIM II), Defense Advanced Research Projects Agency (DARPA), \$504,239 (Approved but pending, with PI Jennifer Fewell subcontracts to Boston Fusion Corp. ASU portion is \$330,000, and my share from ASU is estimated as 40%).
7. **Research Partnerships**: 01/01/2017-01/01/2021, **Launching the first vaccination programs for a beneficial, pollinating insect**, Research Council of Norway, NOK 10348,000 (As a Research Partner on the aim regarding Mathematical Modeling of Honeybee Vaccine Programs with PI-Gro Amdam).

6. **PI:** 10/01/ 2016-09/30/2022, **Complex Adaptive Systems of Social Insect Colonies: Emergence of Scaling, Social Dynamics, and Evolution Cooperation**, The James S. McDonnell Foundation 21st Century Science Initiative in *Studying Complex Systems Scholar Award*, \$450,000.
5. **Co-PI:** 07/15/ 2016-06/30/2021, **Group Size, Scaling of Work, and Metabolism in Ant Colonies**, NSF IOS/DMS, \$500,000 (Award ID: 1558127, with PI- Jennifer Fewell. My share is estimated as 25%).
4. **Co-PI:** 09/01/ 2015-08/30/2018, **Identifying and Addressing Mathematical Difficulties in Introductory Physics Courses**, NSF DUE, \$250,000 (Award ID: 1504986, with PI- David Meltzer. My share is estimated as 25%).
3. **Co-PI:** 07/01/ 2014-06/30/2017, **ASU-Sloan Program for Exceptional Mentoring (PEM, ASUF 30006275**, with PI- Carlos Castillo-Chavez. My share is estimated as 20%). ASU FDN. \$60,000
2. **Co-PI:** 09/15/2012-08/31/2016, **(WIDER-EAGER) Recognizing, Assessing, and Enhancing Evidence-Based Instructional Practices in STEM at Arizona State University, Polytechnic**, NSF, \$298,352 (Award ID: 1256333, with PI David Meltzer. My share is estimated as 20%).
1. **Sole-PI:** 07/01/2011-08/31/2014, **Global Dynamics of Biological Systems**, *Collaboration Grants for Mathematicians*, Simons Foundation, \$21,000.

I.B.2-Funded Internal Grants:

4. **PI of Summer 2013 Research Initiative** of School of Letters and Sciences, 2013: \$15,000.
3. **PI of Research Grant** from School of Letters and Sciences, Jan -June 2013: *Mathematical modeling in life and social sciences*, \$15,000.
2. **PI of Support and Enhancement (SSE) Competition Grant** from College of Technology & Innovation, Feb -June 2011: *Mathematical modeling of mutualism interactions in life and social sciences*, \$13,400.
1. **PI of Research Grant** from Department of Applied Sciences and Mathematics, 2009 (\$500), 2010 (\$1,200), 2011 (\$6,000).

I.B.3-Travel Awards/Grants/Supports:

11. Oct, 2019: **TTravel Grant** from *The Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA VII)*, \$200 conference registration fee.

10. May, 2019: **Travel Grant** from *Evolution of Complex Life*, \$250.
9. May, 2018: **Travel Grant** from *The 24th International Conference on Difference Equations and Applications*, 1200 EUR.
8. April, 2018: **Travel Grant** from Dartmouth College, \$1,450.
7. Feb, 2018: **Travel Grant** from the Fields Institute, 1,200 CAD.
6. Jan, 2018: **Travel Grant** from NIMBios, \$ 840.
5. April, 2015: **Travel Grant** from Mathematical Biological Institute *Evolutionary Game Theory Workshop*, \$500.
4. July, 2013: **Travel Grant** from NSF-2013 AARMS *Mathematical Biology Workshop*, Memorial University, St John's, Newfoundland, \$1,650.
3. July, 2012: **Travel Grant** from *The 9th American Institute of Mathematical Sciences (AIMS) Conference on Dynamical Systems, Differential Equations and Applications (9th ICDSDEA 2012)*, \$200.
2. May, 2012: **Travel Grant** from *The 2012 Progress on Difference Equations (PODE 2012)*, \$700.
1. July, 2011: **Travel Grant** from *Society for Industrial and Applied Mathematics (SIAM) and NSF for the 7th International Congress on Industrial and Applied Mathematics (ICIAM 2011)*, \$2,400.

I.B.4-Travel Grant/Fellowship Received by Students

32. Fall 2019: Jun Chen obtained both travel awards from both *School of Human Evolution & Social Change (SHESC: \$500)* and *Graduate and Professional Student Association (GPSA\$500)*
31. Fall 2018: Brian Sweeney obtained Research Award on his project of mathematical modeling of honeybee from Science and Mathematics Unit, College of Integrative Sciences and Arts.
30. Fall 2018: Fatima Barat Ali obtained Research Scholarship from Barrett the Honors College (\$2,000).
29. Spring 2018: Marisabel Rodriguez obtained Graduate College Fellowship (\$5,000).
28. Fall 2017: Fatima Barat Ali and Jeffrey Chen each obtained Bidstrup Fellowship (\$2000) for their research projects on *Mathematical Modelling of Social Insects*, respectively.
27. Fall 2017: Komi Messan successfully obtained Graduate College Completion Fellowship for Fall 2017 (e.g., a \$9,500 stipend in Fall 2017 plus a tuition waiver for 1 credit hour.).

26. Spring, 2017: Fatima Barat Ali won the Barrett Technology grant (\$1500)
25. Summer 2017: Komi Messan successfully obtained SHECS Fellowship (\$7000).
24. Fall 2016: Fatima Barat Ali and Jeffrey Chen each obtained Bidstrup Fellowship (\$2000) for their research projects on *Mathematical Modelling of Social Insects*, respectively.
23. March 2017-Feb 2019: **NSF Postdoc Fellowship** (NSF-DBI-1610889) received by Oyita Udiani. \$138,000
22. June-August, 2016: **Graduate-Level Research Fellowship in Industrial Projects for Students** for the graduate student-Krystal Blanco, UCLA and Berlin, Germany.
21. August, 2016: **Travel Grant** for undergraduate student -Fatima Amiri for her research project on *Experiment and mathematical modeling for Harpegnathos Saltator ant* from *MAA MathFest 2016* in Columbus, Ohio, August 3-6, 2016. \$500.
20. July, 2016: **Travel Grants** for graduate students -Xiaohui Guo and Michael Lin for their research projects on *Environmental and spatial heterogeneity's effects on information flow in ant colonies: An agent-based model study* and *Does individual variation matter in spreading alarm signal on social network of seed harvester ants' colonies (Pogonomyrmex californicus)?* for *The 4th Workshop on Biological Distributed Algorithms*, Chicago, IL USA, July 25, 2016. \$750 +750.
19. June, 2016: **Travel Grant** for graduate student -Marisabel Rodriguez from School of Statistics and Mathematics (ASU) for *The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications* (AIMS 2016), Orlando, Florida, U.S, July 01-05, 2016. \$250.
18. Oct, 2015: **Travel Grant** for graduate student -Marisabel Rodriguez from School of Statistics and Mathematics (ASU), Graduate College (ASU) and *The 8th International Symposium on Biomathematics and Ecology: Education and Research-2015*, Illinois State University, Normal, IL, \$ (500+500+150).
17. Oct, 2015: **Travel Grant** for undergraduate student -Katherine Kincade from *The 8th International Symposium on Biomathematics and Ecology: Education and Research-2015*, Illinois State University, Normal, IL, \$150.
16. Oct, 2015: **Travel Grant** for undergraduate student Talia Davies for *The 8th International Symposium on Biomathematics and Ecology: Education and Research-2015*, Illinois State University, Normal, IL, \$750.
15. Oct, 2015: **Travel Grant** for graduate student -Komi Messan from *The 35th Southeastern Atlantic Regional Conference on Differential Equations*, The University of North Carolina at Greensboro, Greensboro, NC. \$750.

14. March, 2015: **Travel Grant** for graduate student -Krystal Blanco for *The Infinity Possibility Conference for Women in Sciences*, Oregon State University. \$500
13. Oct, 2014: **Travel Grant** for undergraduate student -Jose Valenzuela from *The 7th International Symposium on Biomathematics and Ecology: Education and Research-2014*, Claremont Colleges, Claremont, CA, \$500.
12. Oct, 2014: **Travel Grant** for graduate student -Komi Messan from *The 7th International Symposium on Biomathematics and Ecology: Education and Research-2014*, Claremont Colleges, Claremont, CA, \$500.
11. Oct, 2014: **Travel Grant** for graduate student -Marisabel Rodriguez from *The 7th International Symposium on Biomathematics and Ecology: Education and Research-2014*, Claremont Colleges, Claremont, CA, \$500.
10. Oct, 2014: **Travel Grant** for graduate student -Oyita Udiani from *The 7th International Symposium on Biomathematics and Ecology: Education and Research-2014*, Claremont Colleges, Claremont, CA, \$500.
9. Aug, 2014: **Travel Grant** for undergraduate student -Jose Valenzuela from *MAA MathFest 2014*, \$400.
8. Aug, 2014: **Travel Grant** for graduate student -Oyita Udiani from *SIAM-LS 2014*, \$650.
7. July, 2014: **International Travel Grant** for graduate student -Sourav Kumar Samsal from *National Board for Higher Mathematics (NBHM)*, \$2000.
6. Oct, 2013: **Travel Grant** for graduate student -John McKay from *The Sixth International Symposium on Biomathematics and Ecology: Education and Research-2013*, Marymount University Arlington, VA, \$400.
5. Oct, 2013: **Travel Grant** for graduate student -Oyita Udiani from *The Sixth International Symposium on Biomathematics and Ecology: Education and Research-2013*, Marymount University Arlington, VA, \$200.
4. Oct, 2013: **Travel Grant** for graduate student -Sourav Kumar Samsal from *The Fourth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA IV)*, Texas Tech University in Lubbock, Texas, \$1,500.
3. 2013-2015: **Graduate Assistance in Areas of National Need (GAANN)** Fellowship for graduate student -Oyita Udiani.
2. July, 2013: **Travel Grant** for graduate student -John McKay from *NSF-2013 AARMS Mathematical Biology Workshop*, Memorial University, St John's, Newfoundland, \$1,200.
1. October, 2011: **Travel Grant** for graduate student -Lauren Wedekin from *The Third International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA III)*, Trinity University, San Antonio, Texas, \$800.

I.B.5-Pending/Submitted Grants:

1. Discovery Projects in Australian Research Council Proposal (**Co-PI**, 30%), 2020-2023: *Understanding harmful algal blooms under influence of climate change: from predictive and management perspectives*, AUD289,371.
2. NSF-Mathematical Biology (**PI**), 2021-2024: *Multiscale multistage ecological and evolutionary modeling with applications to social insect colonies*, \$245,935

I.B.6-Awards and Fellowships:

- 2016: Arizona State University Leadership Academy, peerLA Cohort IV Member.
- 2013: **Certificate of Excellence in Reviewing** for the journal of *Mathematical Biosciences* in recognition of an outstanding contribution to the quality of the journal.
- Fall 2013: **College Marshal** of the School of Letters and Sciences for the undergraduate commencement ceremony.
- 2010—2011, **Project NExT Fellow**, Mathematical Association of America (MAA). *Project NExT* (New Experiences in Teaching) is a professional development program of the MAA for new or recent PhD.s in the mathematical sciences.

I.C.-Scholarly Presentations:

I.C.1-Invited Lectures/Talks/Workshop Given in the National/International Conferences:

- Invited talk: *Optimal control of a discrete-time plant-pest model with bistability and fluctuating environments*, Virtual Joint Mathematics Meetings, Jan 6-9, 2021.
- Invited talk: *The role of demographic and environmental stochasticity in a population model with a component Allee effect* in M24-Mathematical Advances in Ecology and Evolution, The 3rd Annual Meeting of the SIAM Texas-Louisiana Section, October 16 -18, 2020, Virtual Zoom Meeting Hosted by Texas A&M University.
- Invited Plenary Speaker: *Mathematical Modeling of Complex Adaptive Systems of Social Insect Colonies* in Scientific Computing Around Louisiana (SCALA) at Digital Media Center Theatre, Louisiana State University, Feb 7-8, 2020.
- Invited Mathematical Colloquium: *How Can Mathematics Save Honeybees?* in Department of Mathematics, Tulane University, Feb 5-6, 2020.

- Invited two talks: *Population dynamics of Honeybees: Interplay effects of parasites and nutrition* (January 18 2020) and *Dynamics of task allocation in social insect colonies: Scaling effects of colony size versus work activities* (January 16 2020) in Joint Mathematics Meetings 2020, Denver, CO, January 15-18, 2020.
- Invited talk: *Nutritional Regulation Influencing Colony Dynamics and Task Allocations in Social Insect Colonies* in *The Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems* (ICMA VII), Oct 12-14, Tempe, AZ, 2019.
- Invited talk: *Population Dynamics of Honeybees: Effects of Parasites and Nutrition* The 2019 Annual Meeting and Conference of the Society for Mathematical Biology (SMB) held in Montreal (Canada) from July 21-26, 2019.
- Invited talks: *Mathematical modeling of social insects* and *Social Network Models of Social Insect Colonies: Information Versus Task Switching Dynamics* at the International Congress on Industrial and Applied Mathematics, July 15-19, Valencia, Spain.
- Invited lectures: *Mathematical Modeling of Complex Adaptive Systems* in "Mathematical modeling in life and medical sciences" at National Institute for Mathematical Sciences (NIMS), July 2-4, 2019.
- Invited lecture: *Complex Adaptive Systems of Social Insect Colonies* in the international conference of *Most Recent Progresses on Nonlinear Dynamics and Mathematical Biology* held in North University of China, Jun 27-28, 2019.
- Invited talk: *Modeling Population on Dynamics of Honeybee: Parasite, Disease and Nutrition* in Joint Mathematics Meetings 2019, Baltimore, MD, January 16-19, 2019.
- Invited talk: *Mathematical Modeling on Honeybee Population Dynamics with the Nutritional Status* in AMS Fall Western Sectional Meeting, San Francisco State University, San Francisco, CA, October 27-28, 2018.
- Invited talk: *Dynamics of Social Interactions and Agent Spreading in Ant Colonies: Effects of Environmental Events and Spatial Heterogeneity* in The 8th International Symposium on Biomathematics and Ecology: Education and Research, Arizona State University, Tempe, AZ, Oct 5-7, 2018.
- Invited talks: *On the Preservation of Cooperation in Two-Strategy Games with Nonlocal Interactions* (S11) and *The complex dynamics of a diffusive prey-predator model with an Allee effect in prey* (S46) in The 12th AIMS Conference on *Dynamical Systems, Differential Equations and Applications*, Taipei, Taiwan, July 5-9, 2018
- Invited talk: *Mathematical Modeling of Social Insect Colonies as Complex Adaptive Systems*, The 2018 Guangzhou Mathematics-Tianyuan Exchange Event, Guangzhou University, Guangzhou, China, June 25-30, 2018.

- Invited talk: *Complicated endemics of an SIR model with a generalized incidence under preventive vaccination and treatment controls* in the special session of *Understanding Parasitic and Viral Diseases from a Mathematical Perspective* in the *6th International Conference on Mathematical Biological*, June 22-25, 2018, Beijing, PR China.
- Invited Plenary Speaker: *Discrete Time Population Models: Permanence, Relative Permanence, and Allee effects* in The 24th International Conference on Difference Equations and Applications (ICDEA 2018), Technische Universit Dresden, Germany, May 21-25, 2018.
- Invited Colloquium: *Mathematical Modeling of Complex Adaptive Systems*, Mathematics Department, Dartmouth College, April 26-27, 2018
- Invited talk: Workshop on *Bee and Pollination Modeling* at the Fields Institute in the Thematic Program on *Emerging Challenges in Mathematical Biology* (January 1 to June 30, 2018) at the Fields Institute in Toronto, Ontario, Canada, Feb 26-28, 2018.
- Invited workshop: NIMBios investigative workshop on *Stoichiometric Ecotoxicology*, University of Tennessee, Knoxville, Jan 17-19, 2018.
- Invited talks: *Dynamical effects of nonlocal interactions in discrete-time* in the special session of *Discrete Dynamical Systems and Applications*; *Population dynamics of honeybee: Effects of disease, parasites, and dispersal behavior* in the special session on *Advances in Applications of Differential Equations to Disease Modeling*; and *Dynamics of a diffusion reaction prey-predator model with delay in prey: Effects of delay and spatial components* in the special session on *Mathematical Modeling of Natural Resources* at Joint Mathematics Meetings (JMM), San Diego, Jan 10-13, 2018.
- Invited talk: *Dynamics of hierarchy establishment from nonlinear social interactions and metabolic costs* at *The Sixth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems* (ICMA VI), University of Arizona, Tucson, October 20-22, 2017.
- Invited talks: *Dynamical models of task organization in social insect colonies* (SS51) and *Population dynamics of honeybees with varroa destructor as parasite and virus vector: the potential effects of foraging behavior* (SS05) in *The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications* (AIMS 2016), Orlando, Florida, U.S, July 01-05, 2016.
- Invited talk: *Honeybee disease dynamics and colony collapse disorder*, a special session on *Complex Biological Systems* at *The 8th International Symposium on Biomathematics and Ecology: Education and Research* (BEER-2015), Illinois State University, Normal, IL, October 09-11, 2015.
- Invited talk: *Colony Collapse Disorder (CCD) of Honeybees: linking parasite infestations, diseases, and nutrient effects*, a special session on *New Developments in Population Dynamics and Epidemiology* at AMS 2015 Spring Southeastern Sectional Meeting, Huntsville, AL, March 27-29, 2015.

- Invited talk: *Ecological and evolutionary dynamics of a two-stage model for social insects*, a special session on *Mathematics in Natural Resource Modeling at Joint Mathematics Meetings*, Baltimore, MD, Jan 10-13, 2015.
- Invited talk: *Ecological and evolutionary models of social insects*, *Workshop on Mathematical Biology and Nonlinear Analysis*, The University of Miami, Coral Gables, Florida, Dec 19-21, 2014.
- Invited talk: *Mathematical model of a two-stage model for social insects*, a special session on *Social Insects as Complex Systems at The 7th International Symposium on Biomathematics and Ecology: Education and Research (BEER-2014)*, Claremont Colleges, Claremont, CA, October 10-12, 2014.
- Invited talk: *Ecological and evolutionary dynamics of a single species population model with a component Allee effect*, a special session on *Mathematical Models in Biology and Epidemiology at SIAM Conference on the Life Sciences*, Sheraton Charlotte, Charlotte, North Carolina, August 04-07, 2014.
- Invited seminar: *Population dynamics of Intraguild predation*, Department of Mathematics and Information Science, Zhejiang University of Sciences and Technology, Hangzhou, P.R.China, June 16, 2014
- Invited seminar: *Mathematical model of social insects*, College of Mathematics and Information Science, Wenzhou University, Wenzhou, P.R.China, June 13, 2014
- Invited lecture: *Mathematical modeling of social insects* in the international conference of *Eighth International Conference on Recent Advances in Applied Dynamical Systems*, Guilin University of Electronic Technology, Guilin, China, June 2-4, 2014.
- Invited talk: *A simple model of foraging activity in colonies of seed harvester ants*, a special session on *Mathematics in Natural Resource Modeling at Joint Mathematics Meetings*, Baltimore, MD, Jan 15-18, 2014.
- Invited seminar: *Ecological and evolutionary dynamics of biological models*, the BioCircuits Institute, University of California, San Diego, Jan 07, 2014.
- Invited talk: *Dynamics of a general stochastic differential equation SIRS epidemic model with ratio-dependent incidence rate*, a special session on *Disease Dynamics and Control at The 6th International Symposium on Biomathematics and Ecology: Education and Research (BEER-2013)*, Marymount University, Arlington, VA, October 11-13, 2013.
- Invited talk: *Dynamics of SI models with both horizontal and vertical transmissions as well as Allee effects*, a special session on *Mathematical Models in Biology and Physiology at the American Mathematical Society Southeastern Sectional Meeting*, University of Louisville, Louisville, KY, October 5-6, 2013.

- Invited talk: *Permanence of ecological models with nonlinear per capita growth rates*, a special session on *Persistence and Permanence in Multi-Species Population Models* at *The Fourth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA IV)*, Texas Tech University in Lubbock, Texas, October 4-6, 2013
- Invited lecture: *Allee effects in Eco-epidemiology models*, The Lloyd G. Roeling Mathematics Conference, UL Lafayette campus, Nov 02-04, 2012.
- Invited talk: *A simple epidemiological model with Allee effects and the disease-modified fitness*, Special Sessions of *Biomathematics*, Fall Western Sectional Meeting, American Mathematical Society (AMS), Tucson, Arizona, October 27-28, 2012.
- Invited talk: *Multiple attractors in Intraguild Predation models with generalist or specialist predator* at the special section *Mathematical Models in Biology and Medicine* in the 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications (AIMS 2012), Orlando, Florida, U.S, July 01-05, 2012.
- Invited talk: *The relative permanence of a discrete-time competition model* at the *Progress in Difference Equations (PODE 2012)*, Virginia Commonwealth University in Richmond, Virginia, USA, May 13 -18, 2012.
- Invited talks: 1. *Complicated dynamics of a simple SI model with Allee effects* and 2. *Mathematical modeling on obligate mutualism: leaf-cutter ants and fungus growth during early colony expansion* at the *International Symposium on Biomathematics and Ecology: Education and Research (BEER-2011)*, University of Portland, Portland, OR, December 17-18, 2011.
- Invited talk: *Interplay between Allee effects and competition* at *The Third International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA III)*, Trinity University, San Antonio, Texas, October 7-9, 2011.
- Invited talk: *The role of space in the exploitation of resources* in the minisymposium on *Modeling of Ecological Systems* at *ICIAM 2011*, Vancouver, BC, Canada, July 18 - 22, 2011.
- Invited talk: *Modeling an Obligate Mutualism: Leaf-cutter ants and its fungus garden* in the minisymposium on *Recent applications of dynamical systems in ecology* at *Society for Industrial and Applied Mathematics (SIAM) Conference on Applications of Dynamical Systems*, Snowbird, Utah, USA, May 22-26, 2011.
- Invited lecture: *Relative Permanence in Biological Systems* in the international conference of *Fifth International Conference on Recent Advances in Applied Dynamical Systems*, Shanghai Normal University, Shanghai, China, May 16-18, 2011.
- Invited talk: *A discrete two-patch model of plant-insect interactions with Allee-like effects* in the special session on *Continuous and Discrete Dynamical Systems* in American Mathematical Society Meeting, 2010 Fall Western Section, Los Angeles, CA, October 9-10, 2010 .

- Invited talk: *Dynamics of plant-herbivore models with monotone plant growth rate*, 2009 Fall Eastern Section Meeting University Park, PA, October 24-25, 2009.
- Invited talk: *Stochastic and deterministic two-patch models with Allee effect*, First Joint Meeting of the Society for Mathematical Biology and the Chinese Society for Mathematical Biology, Hangzhou, P.R. China, June 14-17, 2009.
- Invited talk: *Dynamics of plant-herbivore models with monotone plant growth rate*, AMS 2009 Spring Southeastern Section Meeting Raleigh, NC, April 4-5, 2009.

I.C.2-Contributed Talks/Poster Presentations Given in the National/International Conferences/Workshops or Attended Workshops:

- Contributed talk: *Complex adaptive modeling framework to study task organization in social groups* in *Evolution of Complex Life*, Georgia Tech, Atlanta, May 15-17, 2019.
- Contributed talk: *Dynamical implications of bidirectional resources exchange between two ecosystems* in *The 2016 International Conference of the Resource Modeling Association*, Flagstaff, Arizona, June 14-17, 2016.
- Contributed talk: *Co-evolutionary dynamics of a host-parasite interaction model: obligate versus facultative social parasitism*, in the invited Mini-symposia on *Complex Adaptive and Evolutionary Models in Biology* in Mathematical Models in Ecology and Evolution (MMEE 2015), College of France, Paris, July 08-10, 2015.
- Poster: *Ecological and evolutionary dynamics of a two-stage model of social insects with egg cannibalism and division of labor* at *2Modeling and Sustainability of Biodiversity and Ecosystem Services*, University of Bordeaux , June 29 - July 1, 2015.
- Posters: *Co-evolutionary dynamics of a host-parasite interaction model: obligate versus facultative social parasitism* and *A two patch prey-predator model with adaptive dispersal strategies* at *Evolutionary Game Theory Workshop*, Mathematical Biological Institute, OSU, OH, April 27-May 01, 2015.
- Contributed talk: *Dynamics of intraguild predation models*, in the session *Populations, Metapopulations, and Dispersal* at *2013 AARMS Mathematical Biology Workshop*, Memorial University, St John's, Newfoundland, July 27-29, 2013.
- Poster: *Population dynamics of Intraguild Predation models with generalist or specialist predator*, SIAM conference on Life Sciences, San Diego, August 07-10, 2012.
- Workshop 2: *Circadian Clocks in Plants and Fungi*, Mathematical Biosciences Institute, Ohio State University, October 25-29, 2010.
- Contributed talk: *Dynamics of a discrete two-patch model on plant-insect interactions*, Mathfest 2010, Mathematical American Association, Pittsburgh, Pennsylvania, August 5-7, 2010.

- Poster: *Dynamics of a plant-herbivore model*, Workshop for Young Researchers in Mathematical Biology (WYRMB), Mathematical Biosciences Institute, Ohio State University, August 24-26, 2009.
- Contributed talk: *Dispersal effects of a plant-herbivore interaction two-patch models*, SIAM Conference on Control & Its Applications, Colorado Convention Center, Denver, Colorado, July 6-8, 2009.

I.C.3-Lectures/Posters/Seminars/Talks Given at ASU:

- Invited lecture: *Mathematical and theoretical biology institute: Continuous Time Models in Population Dynamics*, June 13, 2018.
- Invited lecture: *Mathematical Modeling of Complex Adaptive Systems*, Seminar of *the Fundamentals of Complex Adaptive System*, Arizona State University, Oct 23, 2017.
- Seminar talk: *Mathematical Modeling of Social Insects*, Research Seminar at Social Insects Research Group of School of Life Sciences, Arizona State University, December 05, 2015.
- Sabbatical talk: *Colony Collapse Disorder (CCD) of Honeybees: linking parasite infestations, diseases, and nutrient effects*, Applied Science Seminar of College of Letters and Sciences, Arizona State University, November 18, 2015.
- Invited lectures: Gave two lectures at *Mathematical and Theoretical Biology Institute: Ecological models*, June 08 and June 17, 2015.
- Seminar talk: *Colony Collapse Disorder (CCD) of Honeybees: linking parasite infestations, diseases, and nutrient effects*, Mathematical Biology Seminar of School of Mathematical and Statistical Sciences, Arizona State University, March 20, 2015.
- Invited lectures: Gave two lectures at *Mathematical and Theoretical Biology Institute: Ecological and evolutionary models for social insects*, June 30 and July 01, 2014.
- Seminar talk: *Mathematical Modeling in Biology and Epidemiology*, Science and Mathematics Seminar, Arizona State University, Sep 11, 2013.
- Invited lectures: Gave two lectures at *Mathematical and theoretical biology institute: Dynamics of Ecological and Epidemiology Models*, June 19 and 20, 2013.
- Workshop talk: *SI models with Allee effects and dispersal*, Workshop of MASpreading organized by Charles Perrings, Tempe, Arizona, Dec 13-14, 2012.
- Seminar talk: *Population dynamics of intraguild predations*, Mathematical Biology Seminar of School of Mathematical and Statistical Sciences, Arizona State University, October 19, 2012.

- Invited lectures: Gave two lectures at *Mathematical and theoretical biology institute: Population dynamics of Intraguild Predation* (June 14, 2012) and *Mathematical models with Positive density dependence* (June 15, 2012).
- Seminar talk: *Mathematical Modeling in Biology*, Applied Science Seminar of Department of Applied Sciences and Mathematics, Arizona State University, March 05, 2012.
- Seminar talk: *Relative permanence of discrete-time biological models*, Mathematical Biology Seminar of School of Mathematical and Statistical Sciences, Arizona State University, October 21, 2011.
- Invited lecture: *Population dynamics of one and two dimensional discrete time models at Mathematical and theoretical biology institute*, ASU, June 15 - 26, 2011.
- Invited lecture: *Interplay between Allee effects and competition* at workshop III on *Heterogeneity and Ecologies* organized by *Mathematical, Computational & Modeling Sciences Center (MCMSC)*, ASU, June 29, 2011.
- Seminar talk: *Relative nonlinearity and permanence*, Mathematical Biology Seminar of School of Mathematical and Statistical Sciences, Arizona State University, December 04, 2009.

I.C.4-Posters/Talks Given by Students Under My Supervision:

- Talk by Maria Gabriela Navas Zuloaga: *A Mathematical Model of Flexible Collective Defense: Crisis Response in Stingless Bees*, The International Symposium on Biomathematics and Ecology: Education and Research, November 13-15, 2020 (Virtually).
- Poster by Colin M. Lynch: *Testing the Inefficient Task Stimulus Hypothesis: A Simple Computational Model for Hypometric Scaling of Metabolism in Social Insects*, The International Symposium on Biomathematics and Ecology: Education and Research, November 13-15, 2020 (Virtually).
- Invited Talk by Tao Feng: *Dynamics of task allocation of social insect colonies* in *The Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA VII)*, Oct 12-14, Tempe, AZ, 2019.
- Invited Talk by Jun Chen: *A honeybee population model with stage structure and seasonality* in *The Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA VII)*, Oct 12-14, Tempe, AZ, 2019.
- Poster by Jun Chen: *A Time-Delayed Model of Apis Mellifera* in The International Symposium on Biomathematics and Ecology: Education and Research, Arizona State University, Tempe, AZ, Oct 5-7, 2018.

- Poster by Michael Lin: *Group Level Alarm Response Catalyzed by Single Alarmed Ants* in The International Symposium on Biomathematics and Ecology: Education and Research, Arizona State University, Tempe, AZ, Oct 5-7, 2018.
- Poster by Jun Chen: *Social Network Models of Task Switching in Social Insect Colonies: Effects of Social Interactions and Spatial Heterogeneity* in the Sixth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA VI), University of Arizona, Tucson, AZ, October 20-22, 2017.
- Presentation by Marisabel Rodriguez: *Population and Vitellogenin Dynamics of a Honeybees Colony Influencing Division of Labor* in the Sixth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA VI), University of Arizona, Tucson, AZ, October 20-22, 2017.
- Presentation by Komi Messan: *Population Dynamics of the Honeybee-mite Interactions* in the Sixth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA VI), University of Arizona, Tucson, AZ, October 20-22, 2017.
- Poster by Armando Salinas: *Influence of brood deaths on Honey Bee population dynamics and the potential impact of insecticides* in the Sixth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA VI), University of Arizona, Tucson, AZ, October 20-22, 2017.
- Presentation by Jun Chen: *Social Network Models of Task Switching in Social Insect Colonies: Effects of Social Interactions and Spatial Heterogeneity* in the International Symposium on Biomathematics and Ecology Education and Research (BEER 2017), Illinois state university, Bloomington, October 6-8, 2017.
- Presentation by Armando Salinas: *Hierarchy Establishment from Nonlinear Social Interactions and Metabolic Costs: an Application to the Harpegnathos saltator* in the International Symposium on Biomathematics and Ecology Education and Research (BEER 2017), Normal, IL, October 6-8, 2017.
- Presentation by Ben Pyenson: *Behavioral regulation of a hierarchy in a social insect colony* in Qubec Society for the Study of Biological Behavior, Montreal, Quebec, July 18 - 22, 2017.
- Presentation by Marisabel Rodriguez: *Population Dynamics of Honeybees: linking parasites, diseases, and nutritional effects*, Society for Mathematical Biology, Salt Lake City, UT, July 17-20, 2017.
- Poster by Ben Pyenson: *Bending until it breaks: plasticity of reproduction in the ant Harpegnathos saltator* in Animal Behavior Society Annual Meeting, University of Toronto Scarborough Campus, Canada, June 12-16, 2017.
- Presentation by Komi Messan: *A two-patch model of the Honeybee-mite Interactions* in the special session on *Differential Equations and Their Applications to Biology* at American Mathematical Society Sectional Meeting, Bloomington, Indiana, April 1-2, 2017.

- Poster presentation by Xiaohui Guo: *Does individual variation matter in spreading alarm signal on social network of seed harvester ants' colonies (Pogonomyrmex californicus)?* in *The 4th Workshop on Biological Distributed Algorithms*, Chicago, IL USA, July 25, 2016.
- Poster presentation by Micheal Lin: *Environmental and spatial heterogeneity's effects on information flow in ant colonies: An agent-based model study* in *The 4th Workshop on Biological Distributed Algorithms*, Chicago, IL USA, July 25, 2016.
- Invited talk by Marisabel Rodriguez: *Evolutionary dynamics of social insects with cannibalism and division of labor* in *The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications* (AIMS 2016), Orlando, Florida, U.S, July 01-05, 2016.
- Talk by Komi Messan: *Adaptive dispersals of a two-patch prey-predator* at *The 35th South-eastern Atlantic Regional Conference on Differential Equations*, The University of North Carolina at Greensboro, Greensboro, NC, Oct 10-11, 2015.
- Poster by Marisabel Rodriguez: *Evolutionary dynamics of social insects with cannibalism and division of labor* and
Talk by Marisabel Rodriguez: *Honeybee disease dynamics and colony collapse disorder* at a special session on *Complex Biological Systems* of *The 8th International Symposium on Biomathematics and Ecology: Education and Research* (BEER-2015), Illinois State University, Normal, IL, October 09-11, 2015.
- Poster by Talia Davies: *Mathematical Modeling of Honeybee disease and parasites*, at *The 8th International Symposium on Biomathematics and Ecology: Education and Research* (BEER-2015), Illinois State University, Normal, IL, October 09-11, 2015.
- Poster by Marisabel Rodriguez: *Ecological and evolutionary dynamics of a two-stage model for social insects* at *The International Society for Evolution, Medicine & Public Health*, Arizona State University, Tempe, AZ, March 19-21, 2015.
- Poster by Xiaohui Guo: *Dynamics of information spreading, the colony size and spatial heterogeneity* at *The 7th International Symposium on Biomathematics and Ecology: Education and Research-2014*, Claremont Colleges, Claremont, CA, Oct 10-12, 2014.
- Poster by Komi Messan: *Two-patch prey-predator model with dispersal in predator due to self-organizations* at *The 7th International Symposium on Biomathematics and Ecology: Education and Research-2014*, Claremont Colleges, Claremont, CA, Oct 10-12, 2014.
- Poster by Marisabel Rodriguez: *Ecological and evolutionary dynamics of a two-stage model of social insects with egg cannibalism and division of labor* at *The 7th International Symposium on Biomathematics and Ecology: Education and Research-2014*, Claremont Colleges, Claremont, CA, Oct 10-12, 2014.
- Poster by Oyita Udiani: *Division of labor of social ants* at *The 7th International Symposium on Biomathematics and Ecology: Education and Research-2014*, Claremont Colleges, Claremont, CA, Oct 10-12, 2014.

- Poster by Jose Valenzuela: *Social interactions in ant colonies with different task status* at *The 7th International Symposium on Biomathematics and Ecology: Education and Research-2014*, Claremont Colleges, Claremont, CA, Oct 10-12, 2014.
- Contributed talk by Oyita Udiani: *The dynamics of foraging activity in Harvester ants*, in a contributed session (CP13) on *Ecology and Evolution* at *SIAM Conference on the Life Sciences*, Sheraton Charlotte, Charlotte, North Carolina, August 04-07, 2014.
- Poster by Jose Valenzuela: *Social interactions in ant colonies with different task status* in MAA MathFest, Portland, Oregon, August 06-09, 2014.
- Poster by Marisabel Rodriguez: *Ecological and evolutionary dynamics of a two-stage model of social insects with egg cannibalism and division of labor in the 1st International & Interdisciplinary Workshop on the Ecology, Evolution and Dynamics of Dengue and other Related Disease*, Arizona State University, Tempe, August 04-05, 2014.
- Poster by Komi Messan: *Two-patch prey-predator model with dispersal in predator due to self-organizations in the 1st International & Interdisciplinary Workshop on the Ecology, Evolution and Dynamics of Dengue and other Related Disease*, Arizona State University, Tempe, August 04-05, 2014.
- Poster by Sourav Kumar Sasmal: *on Allee effects in Eco-epidemiological systems in the 1st International & Interdisciplinary Workshop on the Ecology, Evolution and Dynamics of Dengue and other Related Disease*, Arizona State University, Tempe, August 04-05, 2014.
- Invited talk given by John McKay: *Network dynamics of social ants* in the special session of *Complex Systems of Social Insects* at *The 6th International Symposium on Biomathematics and Ecology: Education and Research* (BEER-2013), Marymount University, Arlington, VA, October 11-13, 2013.
- Invited talk given by Oyita Udiani: *Mathematical modeling of foraging ants* in the special session of *Complex Systems of Social Insects* at *The 6th International Symposium on Biomathematics and Ecology: Education and Research* (BEER-2013), Marymount University, Arlington, VA, October 11-13, 2013.
- Invited talk given by Sourav Kumar Sasmal: *Dynamics of prey-predator models with Allee effects and disease in prey* in the special session of *Recent Advances in Mathematical Epidemiology and Ecology* at *The Fourth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems* (ICMA IV), Texas Tech University in Lubbock, Texas, October 4-6, 2013.
- Invited talk given by Oyita Udiani: *Co-evolutionary dynamics of a prey-predator model* in the special session of *Evolutionary Modeling in Ecology* at *The Fourth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems* (ICMA IV), Texas Tech University in Lubbock, Texas, October 4-6, 2013.

- Contributed talk *Modeling minority group influence on larger community behavior: measles vaccine refusal and ant networks as examples* given by John McKay in the session *POPULATION DYNAMICS* at *2013 AARMS Mathematical Biology Workshop*, Memorial University, St John's, Newfoundland, July 27-29, 2013.
- Poster presented by John McKay: *Multi-scale dynamical network of social insects (*Pogonomyrmex californicus*) and their labor division*, *The Society for Mathematical Biology Annual Meeting and Conference*, Tempe, Arizona, June 10-13, 2013.
- Poster presented by Oyita Udiani: *Eco-evolutionary dynamics of a Predator-Prey System with Generalist Predation & Type II Functional Response*, *The Society for Mathematical Biology Annual Meeting and Conference*, Tempe, Arizona, June 10-13, 2013.
- Poster presented by Lauren Wedekin: *Modeling Framework of Intraguild Predation*, Showcase at *College of Technology & Innovation*, Arizona State University, April 25, 2012.
- Poster presented by Lauren Wedekin: *Mathematical Models of Intraguild Predation in Ecology*, *The Third International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA III)*, Trinity University, San Antonio, Texas, October 7-9, 2011.

II. Instructional Activities

The Polytechnic campus of ASU primarily serves undergraduate commuters who have extremely diverse backgrounds. As the only faculty in Applied Mathematics, I have worked with other faculty to develop Major and Minor in *Applied Mathematics* in Fall 2016, Fall 2017, respectively. Our applied mathematics program has been thriving. In addition to build new undergraduate programs of Applied Mathematics, I have been able to successfully integrate my research into education by developing graduate course (**ABS 560-Ecological Modeling**) that has become a popular course for the Master's Degree Program of Applied Biological Sciences (ABS) but also other graduate programs at ASU. I also developed two new undergraduate courses: **MAT 494 Introduction to Complex Adaptive Systems** that has been taught since Fall 2018 and **MAT 394 Mathematical Methods and Data** that has been taught since Spring 2020. These two new undergraduate courses will serve as a main upper division course in Applied Math program for undergraduates.

II.A. Teaching activities at the Polytechnic Campus of ASU:

I maintain an active and fun learning environment with an emphasis on understanding, valuing and leveraging student differences, even though lower-division mathematical courses have a reputation for being difficult to teach due to the diverse backgrounds and the different interests/strengths of our students. I engage students in **active learning** by having personal contacts (e.g., individual

meeting with me to discuss about their math background such as their strength and weakness in math), relating mathematical concepts to the daily life to retain students interests and motivations in learning (e.g., final projects related to model real world problems), providing credits for writing a **Math Essay** to reflect on their own study, implementing technology in class (e.g., calculus on-line animations, Peanut Software, Matlab), and using the **problem-oriented approach** to encourage dynamic intellectual interaction and enable students to learn from the world around them. To examine the effectiveness of my teaching and students' learning, I have administered the **Calculus Concept Inventory** Test in my classes. This begins the process of developing baseline student performance data against which future instructional reforms may be measured; this educational research was funded by NSF grants to recognize, assess, and enhance Evidence-Based Instructional Practices in STEM at the Polytechnic campus of ASU.

I have actively mentored both undergraduate and graduate students from different disciplinary units such as biology, engineering and mathematics, to carry out research projects through research classes such as *Undergraduate Research* (ABS 489/499; IDS 401), *Reading and Conference* (ABS/AML 590), *Graduate Research* (ABS 592;AML/APM 792), *Thesis/Dissertation* (MAT 493; MAT 495; ABS 599; AML/APM 799). My long-term work with *Simon A Levin Mathematical, Computational & Modeling Sciences Center*, *Social Insect Research Group*, and *School of Mathematical and Statistical Sciences* provide great opportunities and platforms to work with diverse students, especially minorities, at the interface of Applied Mathematics and Life Sciences.

II.A.3 Courses Taught at the Polytechnic Campus of ASU:

- Fall, 2020: eight independent research/thesis classes including **MAT 495; AML 590/592; AML 792; AML 799.**
- Spring, 2020: **MAT 394 Mathematical Methods and Data; MAT 494/ ABS 560 Ecological Modeling;** and six independent research/thesis classes including **IDS 401; MAT 495; AML 590/592; AML 792; AML 799.**
- Fall, 2019: **MAT 494** An introduction to Complex Adaptive Systems, and five independent research/thesis classes including **AML 590/592; AML/APM 792; AML 792/799.**
- Spring, 2019: **MAT 494/ ABS 560 Ecological Modeling;** and five independent research/thesis classes including **BIO/MAT 495; AML 590/592; APM 792; AML 799.**
- Fall, 2018: **MAT 494** An introduction to Complex Adaptive Systems, and eight independent research/thesis classes including **MAT 492/493; AML 590/592; AML/APM 792; AML 792/799.**
- Spring, 2018: The graduate course with lab **ABS 560 Ecological Modeling;** and seven independent research/thesis classes including **BIO/MAT 493; AML 590/592; APM 792; AML 799.**
- Fall, 2017: **MAT 265** Calculus for Engineers I, and eight independent research/thesis classes including **BIO 492; MAT 492/493; AML 590/592; AML/APM 792; AML 799.**

- Spring, 2017: The graduate course with lab **ABS 560 Ecological Modeling**; and five independent research/thesis classes including **MAT 499**; **AML 590/592**; **APM 792**; **AML 799**.
- Fall, 2016: **MAT 265** Calculus for Engineers I, and eight independent research/thesis classes including **BIO 492**; **MAT 492/493**; **AML 590/592**; **AML/APM 792**; **AML 799**.
- Spring, 2016: **MAT 265** Calculus for Engineers I; the graduate course with lab **ABS 560 Ecological Modeling**; and directed research **BIS 401(1)**, **AML 590 (2)**, **AML 792 (1)**, **AML 799 (1)**, **APM 792 (2)**.
- Fall, 2015: **MAT 265** Calculus for Engineers I (two sections), and six independent research/thesis classes including **ABS 499**; **MAT 492**; **AML 590/592**; **AML/APM 792**.
- Summer, 2015: Graduate Research **APM 792**
- Fall, 2014: **MAT 265** Calculus for Engineers I, the graduate seminar **ABS 691**, and six independent research classes.
- Summer, 2014: The graduate research **AML 792**.
- Spring, 2014: The graduate course **ABS 560 Ecological Modeling** and the graduate seminar **ABS 591**.
- Fall, 2013: **MAT 265** Calculus for Engineers I and the graduate research **AML 792**.
- Spring, 2013: **MAT 265** Calculus for Engineers I, the graduate course **ABS 560 Ecological Modeling** and **ABS 592** Research.
- Fall, 2012: **MAT 265** Calculus for Engineers I (two sections).
- Summer, 2012: **ABS 590** Reading and Conference and **ABS 489** Undergraduate Research.
- Spring, 2012: **MAT 265** Calculus for Engineers I, the graduate course **ABS 560 Ecological Modeling**, **ABS 590** Reading and Conference, **ABS 592** Research and **ABS 599** Thesis.
- Fall, 2011: **MAT 265** Calculus for Engineers I, **MAT 275** Modern Differential Equations and **ABS 599** Thesis.
- Summer, 2011: **ABS 590** Reading and Conference and **ABS 599** Thesis.
- Spring, 2011: **MAT 265** Calculus for Engineers I, the graduate course **ABS 560 Ecological Modeling**, **ABS 592** Research and **ABS 599** Thesis.
- Summer, 2011: **ABS 590** Reading and Conference and **ABS 599** Thesis
- Spring, 2011: **MAT 265** Calculus for Engineers I, **ABS 590** Reading and Conference and **ABS 599** Thesis and a new graduate course **ABS 560 Ecological Modeling**.
- Fall, 2010: **MAT 265** Calculus for Engineers I, **MAT 275** Modern Differential Equations and **ABS 489** Undergraduate Research.

- Spring, 2010: **MAT 265** Calculus for Engineers I (two sections).
- Fall, 2009: **MAT 210** Brief Calculus (two sections), **ABS 489** Undergraduate Research.
- Spring, 2009: **APM 265** Mathematics of Change I (two sections)

II.B. Graduate/Undergraduate Students Mentoring:

II.B.1-Graduate Students Mentoring:

II.B.1.1-PhD Students Graduated (where I served as Chair or Co-Chair):

- * Sourav Kumar Sasmal obtained his PhD in May 2015 from the Indian Statistical Institute, Kolkata. I **co-chair his PhD Committee** (co-supervise with Professor Joydev Chattopadhyay). Sourav's PhD thesis was *Mathematical Studies on Allee Effect in Interactive Population*. We have four co-author papers. Dr. Sasmal is doing his research fellowship under Professor Yasuhiro Takeuchi at Aoyama Gakuin University, Japan.
- * Oyita Udiani obtained his PhD in December 2016 from *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe. Oyita's PhD Thesis was *A Mathematical Study of Social Dynamics And Its Consequences for Task Organization in Animal Groups*. Oyita obtained NSF postdoctoral fellowship and joined NIMBIOS in Spring 2017.
- * Komi Messan obtained his PhD in December 2017 from AMLSS at ASU, Tempe. Komi's PhD Thesis was *Prey-predator "Host-parasite" Models with Adaptive Dispersal: Application to Social Animals*. Komi started his job as Research Mathematician with the *Cold Regions Research and Engineering Laboratory of the US Army Engineer Research and Development Center* starting January 2018.
- * Baltazar Espinoza Cortes obtained his PhD in Spring 2018 from AMLSS at ASU, Tempe. His PhD Thesis was *Consequences of short-term mobility across heterogeneous risk environments: the 2014 West African outbreak* (Co-chair with Dr. Carlos Castillo-Chavez). He is currently a Postdoc of *Simon A Levin Mathematical, Computational & Modeling Sciences Center*, ASU.
- * Marisabel Rodriguez obtained her PhD in Summer 2018 from *Applied Mathematics PhD Program* of School of Mathematical & Statistical Sciences (SoMSS) at ASU, Tempe. Her PhD Thesis was *Understanding the Emerging Behaviors and Demands for the Colony Success of Social Insects: A Mathematical Approach*. She will start her Postdoc position at Mathematics Department of *Dartmouth College* in Fall 2018.
- * Jordan Bates obtained his PhD in Summer 2019 from AMLSS at ASU, Tempe. His PhD Thesis was *Measurement, Inference, and Simulation of Student Social Dynamics* (Co-chair with Dr. Maroulis Spiro). He is currently a data scientist.

II.B.1.2-Current Graduate Students Under my Supervision:

- * Lucero Rodriguez is a first year graduate student in AMLSS PhD program at ASU, Tempe. Lucero has been working with me on mathematical modeling of social interactions and cooperation in team dynamics.
- * Jordy Jose Cevallos Chavez is a first year graduate student in AMLSS PhD program at ASU, Tempe. Jordy is exploring his PHD research topic.
- * Maria Gabriela NAVAS ZULOAGA is a second year graduate student in AMLSS PhD program at ASU, Tempe. Maria has been working with me on mathematical modeling of collective decisions.
- * Jun Chen is a fourth year graduate student in AMLSS PhD program at ASU, Tempe. Jun has been working with me on mathematical modeling of social network structure (including task switching) in social insect colonies.
- * Xiaohui Guo is a six year PhD student in *Animal Behavior Program* of School of Life and Sciences (SoLS) at ASU, Tempe. Dr. Fewell is the primary advisor of Xiaohui, and I am co-chairing with Dr. Fewell regarding the mathematical modeling aspects of Guo's research.

II.B.1.3-Master Students Graduated (where I served as Chair):

- * Lauren Wedekin (2010-2012): Lauren graduated in August 2012 with her M.S. degree of *Applied Biological Sciences* at ASU, Polytechnic. I chaired her **M.S. Committee**. Lauren's thesis is *Mathematical Modeling of Intraguild Predation and its Dynamics in Ecology*. She is a co-author of the published article *Dynamics of a intraguild predation model with generalist or specialist predator* (see Section **I.A.1** for details).
- * John McKay (2012-2014): John obtained his Master in Pass in AMLSS due to his exceptional work on *Social network of harvest ants*. His master thesis topic is motif analysis and communication dynamics of social ants. He is currently a PH.D student in the Electrical Engineering program at Penn State.
- * Krystal Blanco (2014-2016): Krystal obtained her Master in Pass in AMLSS on the project *Disease Dynamics of Social Animals*. The related project on the honeybee disease work has been published in the journal of *Mathematical Biosciences*. Krystal is an analyst at Salt River Project, Phx, AZ.
- * Lorenzo Tapia (2014-2016): Lorenzo obtained his Master in Pass in AMLSS on the project *Dynamic Effects of Biocontrol Beetle on the Virgin River Ecosystem*. We published a paper on the topic with collaboration with Dr. Heather Bateman. Lorenzo is an Informatics Analyst I at Health Services Advisory Group, Inc. (HSAG).
- * Jennifer Rodriguez (2015-2017): Jennifer obtained his Master in Pass in AMLSS due to her exceptional work on *the evolutionary models of social insects*.

- * Armando Salinas (2016-2018): Armando will obtain his Master in Pass in AMLSS in Spring 2018 from his work on mathematical modeling of nonlinear hierarchy social structure in social insect colonies.
- * Jun Chen (2016-2018): Jun obtained her Master in Pass in AMLSS in Spring 2018 from her work mathematical modeling of social network structure (including task switching) in social insect colonies.
- * Juan Melendez-Alvarez (2017-2019): Juan obtained his Master in Pass in AMLSS in Summer 2019 from his work on mathematical modeling of disease.
- * Maria Gabriela NAVAS ZULOAGA (2019-2020): Gabriela obtained her Master in Pass in AMLSS in Spring 2020 from her work on *Modeling Distributed Cognitive Systems*.

II.B.1.4-Completed PhD Thesis Committees:

- * May 2020: Elpiniki Nikolopoulou successfully defended his dissertation *Mathematical Modeling of Novel Cancer Immuno-therapies* for her PhD degree in *Applied Mathematics* of School of Mathematical & Statistical Sciences (SoMSS) at ASU, Tempe.
- * April 2020: Enahoro Iboi successfully defended his dissertation *Mathematical Assessment of Control Measures Against Mosquito-borne Diseases* for his PhD degree in *Applied Mathematics* of School of Mathematical & Statistical Sciences (SoMSS) at ASU, Tempe.
- * March 2020: Cesar Paul Montalvo Clavijo successfully defended his PhD dissertation *Understanding the impact of social factors on the transmission of dynamics of infectious diseases across highly heterogeneous environments* in March 2020 in *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe.
- * May 2018: Victor Moreno Martinez successfully defended his PhD dissertation *Understanding the impact of social factors on the transmission of dynamics of infectious diseases across highly heterogeneous environments* in March 2018 in *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe. He is currently a Postdoc of *Simon A Levin Mathematical, Computational & Modeling Sciences Center*.
- * July 2017: Fereshteh Nazari successfully defended her PhD dissertation *Mathematical Model for IL-6-Mediated Tumor Growth, Invasion, and Targeted Treatment* in *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe.
- * July 2017: Miles Manning successfully defended his PhD dissertation *Patterns in Knowledge Production* in *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe.
- * April 2016: Stephen Evilsizor successfully defended his dissertation *Evolutionary Games as Interacting Particle Systems* for his PhD degree in *Applied Mathematics* of School of Mathematical & Statistical Sciences (SoMSS) at ASU, Tempe.

- * April 2016: Ilyssa Summer successfully defended her dissertation *Oncolytic Viral and Immunotherapy Models Combined with Strategies to Ameliorate Cancer Burden* for her PhD degree in *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe.
- * May 2014: Maytee Cruz-Aponte successfully defended her dissertation *Effect of External Factors on Epidemics Dynamics* for her PhD degree in *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe. Maytee is an assistant professor at University of Puerto Rico.
- * May 2014: Emmanuel Morales has been graduated from *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe. Emmanuel's PhD thesis is *The implications of different probability density functions for disease stages in deterministic compartmental epidemiological models on the decisions and effectiveness of public health interventions*.
- * August 2014: Angie Peace successfully defended her dissertation *Stoichiometric Producer-Grazer Models Incorporating the Effects of Excess Food-Nutrient Content on Grazer Dynamics* for her PhD degree in *Applied Mathematics* of School of Mathematical & Statistical Sciences (SoMSS) at ASU, Tempe.
- * November 2014: Yunqin Zhao successfully defended her dissertation *Mathematical and Statistical Insights in Evaluating State Dependent Effectiveness of HIV Prevention Interventions* for her PhD degree in *Applied Mathematics* of School of Mathematical & Statistical Sciences (SoMSS) at ASU, Tempe.
- * November 2014: Aaron Parker successfully defended his dissertation *Cell Quota Based Population Models and their Applications* for his PhD degree in *Applied Mathematics* of School of Mathematical & Statistical Sciences (SoMSS) at ASU, Tempe.

II.B.1.5-Current PhD Thesis Committees:

- Colin Lynch is a first year PhD student in *Animal Behavior* of School of Life Sciences (SoLS) at ASU, Tempe.
- Benjamin Pyenson is a fourth year PhD student in *Animal Behavior* of School of Life Sciences (SoLS) at ASU, Tempe.

II.B.1.6-Completed Master Thesis Committee:

- * Carlos Cruz defended in May 2019 from *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe.
- * Baltazar Espinoza Cortes defended in May 2016 from *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe.

- * Kimberly Jones defended in July 2015 from *School of Mathematical & Statistical Sciences* (SoMSS) at ASU, Tempe.
- * Ilyssa Summer graduated in May 2012 from *Applied Mathematics for the Life and Social Sciences* (AMLSS) at ASU, Tempe. She is a current PhD student in AMLSS.

II.B.1.7-Research Projects Directed (that can lead to publications):

II.B.1.7.1-Current Research Projects:

- * Benjamin Pyenson (2016 –current): He has been working with me on two research projects related to modeling and experiments of social insects: (a) Dynamical Reproduction Ratio in a Shared Hierarchy Social Insect Colonies; (b) What Unique Behaviors Do the *Harpegnathos saltator* Possess That Leads to the Development of Shared Hierarchical Structures.

II.B.1.7.2-Completed Research Projects that have led to publications:

- * Darin Kopp (2016 –2017): He was a second year PhD student of *School of Life Sciences* (SOLS) at ASU, Tempe. His research project is to study *Dynamical Outcomes of Resource Exchanges between Two Metaecosystems*. The related work has been published in *Mathematical Biosciences*. Darin is currently a PhD student in the Ecology and Evolutionary Biology program at University of Oklahoma.
- * Riley Burnette (2013 –2016): Riley obtained her master thesis on *Applied Biological Sciences* at ASU, Polytechnic. I mentored her research project on *Seasonality and Land Cover Type Drive Aphid Dynamics in an Arid City* with Dr. Heather Bateman. She is a PhD student at ASU.
- * Amiya Bhowmick (2011-2012): He is a fourth year PhD student of the Indian Statistical Institute, Kolkata. I have been mentoring him on the project of *Disease Models subject to Allee Effects*. He is a co-author of our two submitted manuscripts *Dynamics of a predator-prey system with prey subject to Allee effects and disease* and *Host-Parasitoid systems with predation-driven Allee effects in host population*, respectively (see Section **I.A.2** for details).
- * Rebecca Clark (2009-2011): She was a PhD student in School of Life Sciences at ASU, Tempe. I worked with her on mathematical modeling of leaf-cutter ants and fungus which led to a publication in *Journal of Theoretical Biology* (2011, see Section **I.A.1** for details). Rebecca is currently a Postdoctoral Research Associate in the University of California, Berkeley.

II.B.2-Undergraduate Students Mentoring:

II.B.2.2-Completed Honor Thesis Students:

- * Spring 2019: Brian Sweeney successfully defended his honor thesis *Mathematical Modeling of Honeybee Population Dynamics* on April 05 2019. He will attend graduate school starting Fall 2019.
- * Summer 2018: Fatima Barat Ali is a fourth year Barrett the Honors College student majoring in Biology. She successfully defended her honor thesis on the data collection of *Worker Policing in Ponerine Ant Species* in May 2018. She will attend Medical School after her graduation from ASU.
- * Summer 2018: Jeffrey Chien is a fourth year Barrett the Honors College student majoring in Engineers. He defended his honor thesis on the analysis and modeling part of *Worker Policing in Ponerine Ant Species* in May 2018. Jeffrey plans to attend graduate school after his graduation from ASU.
- * Fall 2017: Alejandra Mayoral defended her honor thesis on *Analysis of Egg-Laying Rates of Harpegnathos Saltator Through Different Methods of Observation*. Alejandra is going to be getting a Master's Degree in Mathematics Education at Northern Arizona University.
- * Fall 2016: Katherine Kincade defended her honor thesis on mathematical modeling of division of labor of foundress association of ant queens. She currently works in *Cryptanalytic Computer Network Operations Development Program* at NSA.
- * Fall 2015: Talia Davis defended her honor thesis on disease dynamics of honeybees, and graduated from Barrett the Honors College in mathematics. She is a graduate student in the graduate program of *Applied Behavior Analysis* in Psychology Department at ASU.

II.B.2.3-Completed Honor Thesis Committee Member of 7 Undergraduates:

- * Alesandro Arcuri (2015, majoring in Economics and Mathematics at ASU, Tempe).
- * Yili Yu (Thesis defended in 2013, majoring in both Marketing and Mathematics at ASU, Tempe).
- * Austin Wehn (Thesis defended in 2013, majoring in both Computer Sciences and Mathematics at ASU, Tempe).
- * Andrew Sannier (Thesis defended in 2012, majoring in both Computational Math Sciences and Political Sciences at ASU, Tempe).
- * Kenneth Qian (Thesis defended in 2012, majoring in Statistics, Finance, Economics at ASU, Tempe).
- * Jared Neuffer (Thesis defended in 2011, majoring in both Mathematics and Political Sciences at ASU, Tempe).

- * Jeremiah White (Thesis defended in 2011, majoring in both Engineering and Mathematics at ASU, Tempe & Polytechnic). Jeremiah is currently a graduate student in the University of Washington.

II.B.2.5-Research Projects Directed (Name in bold indicates that the research project has led to a publication):

II.B.2.5.1-Current Research Projects:

- * Brian Martinicky (2020 Spring-): His research project has been exploring mathematical modeling in life and social sciences .
- * James Agbay (2016-): His research project is to develop an adaptive model on social ants.
- * Charlotte Deming (2016-): Her research project is to do agent-based models of social insect colonies.

II.B.2.5.2-Completed Research Projects:

- * Tanner Dolby (2019 Spring-2020 Spring): His research project was to explore mathematical modeling in life and social sciences and built a research website.
- * McKenna Manning (2017 Fall): Her research project was to explore mathematical modeling in life and social sciences .
- * Bradley Stiefel (2016): His research project was to develop an adaptive model on the foraging allocation due to nutrient constraints.
- * Nghia Millard (2016): His research project was to do agent-based models of task switching in social insect colonies.
- * Lauren Engel (2015): Her research project was to develop a agent-based model of evolution reproduction of harvest ants.
- * Heather Lyons (Spring 2016): Her research project was to study *How Social Insect Colonies Prevent the Spread of Diseases*.
- * Jose Valenzuela (2014-2016): His research interest was to develop an agent-based model of (1) prey-predator interactions with adaptive dispersal strategies in predator; and (2) Social network models of information flow in social ants colonies.
- * **Jonny Woodbury** and **Tin Phan** (2015-2016): Their research project was to model the dynamics of leaf cutter ants and their fungus garden with division of labor and egg cannibalism. This project led to a submission that is under review.

- * Alessandro Laspina (2015-2016): His research interest was to explore the application of social insects to engineer.
- * Benjamin Krakoff (from Yale University) and Jose Valenzuela: Their research project was to model social interactions between different task groups of social insects.
- * Jared Scolaro and Mitchell Anhoury (2014-2016): Their research project was to model division of labor of foundress association in social ants by using Netlogo.
- * Haoning Zhang (2013 Spring): His research project was to explore how fluctuating environments affect the bistability regions of discrete-time models on plant-herbivore interactions.
- * Huang Wang (2011-2012): His research project was to model fish populations by using discrete-time models.
- * **Michael Makiyama** (2010-2011): His research project was to perform parameter estimations on an obligate mutualism model. Partial results of this research is a subsection of our co-authored paper on mathematical modeling of leaf-cutter ants and fungus that is published in *Journal of Theoretical Biology* (2011, see Section **I.A.1** for details). Michael is a graduate student in Oregon State University.
- * Wenyu Zheng (Fall 2010): Her research project was to study the dynamics of “Good Win” business cycles by using ecological theory of predator-prey interactions.
- * Ben Cody (Fall 2009): His research project was to use graph theory to do a social network analysis of players in the national basketball association.
- * Michael Katic (Fall 2009): His research project was to model plant-herbivore interactions in seasonal environments. Michael is working as Software Applications Engineer in Microchip Technology.
- * Hanning Ren (Fall 2009): His research project was to use discrete-time systems to model population dynamics of leafcutter ants.

II.B.2.6-Obama Scholar Mentor for 4 undergraduate students at ASU since Fall 2010. I meet with scholars monthly to discuss why they are studying at ASU and what do they want to get out of their college experience. I provide an open, tolerant environment for scholars to share their concerns, struggles and engage in problem-solving behavior.

- * Joshua Handler: Fall 2012-current.
- * Jennifer Grijalva: Fall 2011-Spring 2012.
- * Kayla Burkholder and Alexandra Morris: Fall 2010- Spring 2011.

II.B.2.7-Obama Scholar Mentor for 4 undergraduate students at ASU since Fall 2010. I meet with scholars monthly to discuss why they are studying at ASU and what do they want to get out of their college experience.

III.A. K-12 Students Mentoring: Since Fall 2019, my lab has been mentoring high schools for ASU SCENE Program (<https://eoss.asu.edu/access/scene>). During the academic year of 2019-2020, high school kids Sohan Chollera and Shruti Ramkumar have been working with me and my graduate students on mathematical modeling for honeybee.

III. Service Activities

III.A. Service at Arizona State University:

III.A.1-Unit Service:

- Evaluation for Faculty: Fall 2014-current.
- Chair of Personnel Committee: Fall 2017–Spring 2018.
- Personnel Committee: Fall 2015–Spring 2017.
- Committee to develop major and minor in Mathematics: Fall 2015-Spring 2017.
- The organizing committee of Applied Science Seminars of CLS: Fall 2014.
- University Senator of Science and Mathematics Faculty of College of Letters and Sciences (CLS, Poly): Fall 2013-Fall 2016.
- Applied Mathematics Search Committee: Spring 2011-Fall 2012.
- Awards Committee for Applied Sciences and Mathematics: Spring 2011-Fall 2012.
- Committee to develop minor in Mathematics: Fall 2010-Fall 2012.
- Committee of *Reviewing Graduate Degree Program of the Master's Degree for Applied Biology Science*: Spring 2009- Spring 2011.
- Committee of *Undergraduate Research*: Fall 2010- Spring 2011
- Committee to develop minor in Physics: Fall 2010- Spring 2011.
- Committee of *Hiring Lecturers in Mathematics*: 2010 Summer.
- Committee of *Developing Professional Sciences Masters*: Spring 2009- Fall 2010.
- Committee of *Evaluating Instructional Specialists*: Spring 2009- Fall 2010.

III.A.2-College Service:

- Personnel Committee: Fall 2018–Fall 2019.
- Committee on Committee (represent Poly Campus) Fall 2015-Fall 2016.
- Governance Grievance Committee (represent Poly Campus) Fall 2015-Spring 2018.
- Grievance Clearinghouse Committee (represent Poly Campus) Fall 2015-Spring 2018.
- The search committee of Dean of College of Letters and Sciences (CLS, Poly) Fall 2014.
- Membership of AMLSS Graduate Studies Committee: Fall 2014-current.
- Committee member of Scholarship for *College of Technology & Innovation* (CTI): Spring 2012-Fall 2012.
- PhD Admission Committee for *Simulation, Modeling, and Applied Cognitive Science* (SMACS) PhD Program: Spring 2011-current.
- Obama Scholar Mentor: Fall 2010-Fall 2014 (I have been mentoring 4 undergraduate students in the CTI).
- Committee member of Academic Standards of CTI: Fall 2010-Fall 2012.

III.A.3-University Service:

- University Advisory Board of *Career and Professional Development Services*, 2020- 2022.
- Executive Board of ASU Faculty Women’s Association Fall 2016-current.
- Past-President of Poly Campus Assembly, University Senate Committee, 2020-2021.
- President of Poly Campus Assembly, University Senate Committee, 2019-2020.
- President-Elect, Poly Campus Assembly, University Senate Committee, 2018-2019.
- Chair of Governance Grievance Committee, 2017- 2018

III.B. Professional Service:

III.B.1- Local Organizing Committees of National and International Conferences:

- June 10-13, 2013: I served on the local Organizing Committee of *The Society for Mathematical Biology Annual Meeting and Conference*, Tempe, Arizona, June 10-13, 2013. See the details of this conference in <http://math.asu.edu/SMB2013>

- October 20 - 22, 2017: I served on the local Organizing Committee of *ICMA VI : Sixth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems*, at University of Arizona. See the details of this conference in <https://math.la.asu.edu/icma2016/scope.html>
- October 05-07, 2018: I served on the local Organizing Committee of *The 11th International Symp. on BEER*. See the details of this conference in <https://about.illinoisstate.edu/biomath/beer/Pages/default.aspx>
- October 12 - 14, 2019: I served on the local Organizing Committee of *ICMA VII : Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems*, Arizona State University, Tempe. See the details of this conference in <https://math.asu.edu/icma-2019>

III.B.2-Editorship:

- Guest Editorship (2020): Special Issue *Mathematical modeling and analysis of social and ecological determinants for the dynamics of infectious diseases and public health policies* in *Mathematical Biosciences and Engineering*. See the details of this issue in <https://www.aimspress.com/newsinfo/1383.html>
- Fall 2017-Current: Serve on Editorial Board of *Nonlinear Dynamics and Systems Theory*.
- Summer 2017-Current: Serve on Editorial Board of *Natural Mathematical Modeling*.
- Fall 2013-Current: Serve on Editorial Board of *JSM Mathematics and Statistics* (<http://www.jscimedcentral.com/Mathematics/aims-scope>).
- Guest Editorship: Special Issue *Advanced Nonlinear Dynamics of Population Biology and Epidemiology in Abstract and Applied Analysis* (with Weiming Wang, Malay Banerjee, and Kaifa Wang). See the details of this issue in <http://www.hindawi.com/journals/aaa/si/984374/>

III.B.3-Chaired/Organized minisymposium in the national/international conferences:

- October 31-November 02, 2019: Organized a special session on the topic of *Complex Adaptive Systems* in 2019 SACNAS-*The National Diversity in STEM Conference*, Honolulu, Hawai'i, October 31-November 02, 2019.
- July 01-05, 2016: Organized a special session on the topic of *Complex Biological and Ecological Systems* (SS96) in *The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications* (AIMS 2016), Orlando, Florida, U.S, July 01-05, 2016.

- October 09-11, 2015: Organized an invited special topic on *Complex Biological Systems at The 8th International Symposium on Biomathematics and Ecology: Education and Research* (BEER-2015), Illinois State University, Normal, IL, October 09-11, 2015.
- September 28-Oct 02, 2015: Co-organizes a satellite session on *Complex Biological Systems that Link Disease, Parasites, and Nutrient Ecology at Conference on Complex Systems* (CCS-2015), Arizona State University, Tempe, AZ, September 28-Oct 02, 2015.
- July 8-10, 2015: Co-organizes a mini-symposia on *Complex Adaptive and Evolutionary Models in Biology* in *Mathematical Models in Ecology and Evolution* (MMEE 2015), College of France, Paris, July 08-10, 2015.
- October 10-12, 2014: Co-organizes an invited special topic on *Social Insects as Complex Systems at The 7th International Symposium on Biomathematics and Ecology: Education and Research* (BEER-2014), Claremont Colleges, Claremont, CA, October 10-12, 2014.
- August 4-7, 2014: Co-organized a minisymposium on *Mathematical Models in Biology and Epidemiology* and Chaired a contributed session on epidemiology (CP3) in SIAM Conference on the Life Sciences (LS14), Sheraton Charlotte in Charlotte, North Carolina, USA, August 4-7, 2014.
- October 11-13, 2013: Co-organized an invited special session on *Complex Systems of Social Insects at The 6th International Symposium on Biomathematics and Ecology: Education and Research* (BEER-2013), Marymount University, Arlington, VA, October 11-13, 2013.
- October 5-6, 2013: Co-organized a special session on *Mathematical Models in Biology and Physiology at the American Mathematical Society Southeastern Sectional Meeting*, University of Louisville, Louisville, KY, October 5-6, 2013.
- October 4-6, 2013: Co-organized two special sessions on *Evolutionary Modeling in Ecology* with Oyita Udiani and *Recent Advances in Mathematical Epidemiology and Ecology at The Fourth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems* (ICMA IV), Texas Tech University in Lubbock, Texas, October 4-6, 2013.
- July 1, 2012: Chaired a session for Special Section 14 on *Mathematical Models in Biology and Medicine* in the 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications (AIMS 2012), Orlando, Florida, U.S., July 01-05, 2012.
- July 18 - 22, 2011: Co-organized a minisymposium on *Modeling of Ecological Systems at the 7th International Congress on Industrial and Applied Mathematics* (ICIAM 2011), Vancouver, BC, Canada, July 18 - 22, 2011.
- May 22 - 26, 2011: Co-organized a minisymposium on *Recent applications of dynamical systems in ecology at SIAM Conference on Applications of Dynamical Systems* (SIAM DS11), Snowbird, Utah, USA, May 22 - 26, 2011.

- January 6-9, 2011: Co-organized a minisymposium on *Applications of Difference and Differential Equations in Ecology and Epidemiology I& II* at *Joint Mathematics Meetings*, New Orleans, January 6-9, 2011.

III.B.3-Panelist/Reviewers for Grant Proposals:

- May, 2020: *Ad hoc* reviewer for NSF Panel.
- Oct, 2019: Served on NSF Panel.
- Since 2019: Proposal reviewer for the annual internal grant competition at the Center for Excellence in Applied Computational Science & Engineering (CEACSE) in the University of Tennessee at Chattanooga (UTC).
- January, 2018: Reviewer for the Alberta Conservation Association's ACA Research Grants program.
- August, 2017: Reviewer for the excellence programme of the Vienna Science and Technology Fund (www.wwtf.at) within the Vienna Research Groups for Young Investigators call in the field of "Mathematics and?"
- August, 2014: Reviewer for CZECH Science Foundation.
- March, 2014: Served on NSF Panel.
- January, 2012: *Ad hoc* reviewer for Post-Doctoral Research Fellowship in *Ecology & Evolutionary Biology* Program of NSF (1).
- July, 2010: *Ad hoc* reviewer for *Population and Community Ecology* program of NSF (1).

III.B.4-External Examiner for PhD Dissertation:

- Summer 2014- External examiner for Xi Hu's PhD dissertation on the topic of *Dynamics of Intraguild Predation Models* for Dept. of Mathematics & Statistics, The University of New Brunswick.

III.B.5-Reviewer for Journals: Since 2008, I have reviewed more than **10** papers per year for over a **dozen** of journals in the field of mathematics and theoretical biology, including but not limit to *Advanced Robotics*; *Applied Mathematical Modeling*; *The American Naturalist*; *Animal Ecology*; *Applied Mathematical Modeling*; *Bulletin of Mathematical Biology*; *BIOMATH*; *Biosystems*; *International Journal of Bifurcation and Chaos*; *Ecological Applications*; *Ecology*; *Ecological Modelling*; *Ecological Complexity*; *Current Zoology*; *Journal of Acta Biotheoretica*; *Journal of Advances in Difference Equations*; *Journal of Biological Dynamics*; *Journal of Biological Systems*; *Journal*

of Computers and Mathematics with Applications; Journal of Difference Equations and Applications; Journal of Discrete and Continuous Dynamical Systems; International Journal of Bifurcation and Chaos; International Journal of Computational Mathematics; International Journal of Nonlinear Sciences and Numerical Simulations; Journal of Theoretical Biology; Journal of Mathematical Biology; Journal of Mathematical Analysis and Applications; Journal of Mathematics and Computers in Simulation; Journal of Mathematical Medicine and Biology; Journal of Nonlinear Analysis: Real World Applications; Journal of Nonlinear Analysis; Journal of Nonlinear Differential Equations and Applications; Journal of Nonlinear Dynamics and Systems Theorem; Journal of Oikos; Mathematical Biosciences; Mathematical Biosciences and Engineering; Natural Resource Modeling; Population Ecology; PLUSONE in Biology; Proceedings of Royal Society B; Theoretical Population Biology; Theoretical Population Biology; Theory in Biosciences; SIAM-Applied Dynamics.

III.C.Community Service:

- Feb 01, 2020-Jan 31, 2023: the AMS-Simons Travel Grants Committee.
- Feb 01, 2020-Jan 31, 2023: AMS Representative to the Joint Committee on Women in the Mathematical Sciences.
- Aug 30, 2019-July 31, 2021: the treasure and the board of directors of *International Society of Difference Equations*.
- May 2017-current: Society for Industrial and Applied Mathematics (SIAM) Faculty Advisor for SIAM Chapter at Arizona State University.
- March 4, 2013: Participate in the *6th Arizona MGE@MSA Faculty Doctoral Mentoring Institute*, Arizona State University, Tempe Campus.
- 2011-2014, I actively involved in the program of *Women in Science and Engineering (WISE)* at CTI. I have participated in brainstorm how Polytechnic campus can partner with Girl Scouts-Arizona Cactus-Pine Council in promoting careers in STEM among young women through their Generation STEM program with Barbara Aarestad and Carolyn Starr (ASU, Polytechnic).
- March 13-15, 2010: Participant in mathematical outreach program for high school students. The recent activity is *Math Circles on the Road at ASU*, where I volunteered for holding a table on the topic “Index and Harry Ball” for high school kids.
- 2010 Summer, I served as a Judge for *AWM Essay Contest: Biographies of Contemporary Women in Mathematics*.
- 2009-2011, I mentored an undergraduate student-Ana Gonzalez who was in Mathematics Education Program at the University of California, Irvine, through *AWM network*. We called each other every week from 30 minutes to an hour to discuss the progress of her study (e.g., how to deal with abstract concepts in Linear Algebra; which courses should take; what kind of summer workshops she could apply).

- May 2009-Spring 2015, I served on the *Committee of Association for Women in Mathematics (AWM) Mentor Network*. My duty is to assign a proper mentor (professors, associated professors and assistant professors) to mentee (undergraduate, graduate, junior faculty) according to mentee's request.

III.D. Professional Affiliations:

- Member of the *American Mathematical Society (AMS)*;
- Member of the *Association for Women in Mathematics (AWM)*;
- Member of the *Faculty Association for Women (FAW)* at Arizona State University;
- Member of the *International Society of Difference Equations (ISDE)*;
- Member of the *Mathematical Association of America (MAA)*;
- Member of the *Society of Mathematical Biology (SMB)*;
- Member of the *Society for Industrial and Applied Mathematics (SIAM)*.