SIMIODE Newsletter December 2018 Special Issue

Volume IV Number 6

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WELCOME TO SIMIODE AND OUR NEWSLETTER

SIMIODE - Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations is about teaching differential equations using modeling and technology upfront and throughout the learning process. Learn more at our dynamic website, www.simiode.org. SIMIODE is now entering its sixth year as a community and its fifth year in publishing this newsletter.

SIMIODE is a 501(c)3 nonprofit organization, based in Cornwall, New York in the United States. Contact: Director@SIMIODE.org.
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SIMIODE AT JOINT MATH MEETINGS - BALTIMORE MD USA - 16-19 JANUARY 2019

Project NExT Workshop on Using Mathematical Software
Effective Use of Computer Software in Mathematics Classrooms
Room 308, BCC, Wednesday, 16 January 2019, 9:40 AM - 10:55 AM

Panel
Matthew Richey, St. Olaf College
William Stein, Sage and CoCalc
Beverly West, Cornell University, CODEE
Brian Winkel, SIMIODE

MAA Contributed Paper Session
Introducing Mathematical Modeling through Competitions
Room 304, BCC, Wednesday January 16, 2019, 9:00 a.m.-10:55 a.m.

10:40 AM Modeling Competitions: Perspectives of Student and Faculty.
Patrice G Tiffany*, Manhattan College

Emma Regenauer, Manhattan College
11:00 AM Student Competition Using Differential Equation Modeling - SCUDEM for Students and Faculty.
Brian Winkel*, SIMIODE Director, Cornwall NY

MAA Workshop - FREE Drop-In Workshop
Making it Happen: Modeling in Your Differential Equations Course
Room 324, BCC, Thursday, 17 January 2019, 9:00 AM - 10:20 AM

Workshop participants experience modeling with differential equations in a way they can bring into their own classroom. Modeling activities are used so teachers can experience, as students, what it is like to learn and teach in a modeling-based differential equations environment. We do this with engaging examples, situations in which modeling gives rise to mathematics. Modeling Scenarios from the SIMIODE - Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations community at www.simiode.org will serve as example opportunities.

Participants generate and collect data through experiments, build a mathematical model, estimate parameters, validate the model, and create the need for learning about differential equations as a direct result of the modeling activity. Examples will involve collecting data and using data from sources, modeling, and parameter estimation. The demonstrations of the effective use of modeling to motivate the study of differential equations will be suitable for different school settings, high schools, two-year colleges, and four-year institutions. Workshop participants will leave with a large collection of materials they can use to offer a modeling-based approach in their own differential equations courses.

MAA Poster Session
Projects Supported by the NSF Division of Undergraduate Education
Exhibit Hall G, 100 Level, BCC, 17 January 2019, 2:00 PM - 4:00 PM

Building Community Through Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations (SIMIODE)
Come visit with us!

AMS Special Session

Using Modeling to Motivate the Study of Differential Equations, I
Room 336, BCC, 19 January 2019, 8:00 AM -11:50 AM

8:00 a.m.
An Effort to Assess the Impact a Modeling First Approach has in a Traditional Differential Equations Class.
Rosemary C Farley*, Manhattan College
Patrice G Tiffany, Manhattan College

8:30 a.m.
Using Real Data to Study the Heat Equation.
Kimberly Spayd*, Gettysburg College

9:00 a.m.
Virtual Experiments and Differential Equations Models.
Chris McCarthy*, Borough of Manhattan Community College CUNY

9:30 a.m.
Engaging and supporting students as they explore mathematical modeling in differential equations.
Christine Sample*, Emmanuel College
Joanna A Bieri, University of Redlands

10:00 a.m.
Teaching Differential Equations and Their Applications Using Projects, Online Resource, and More.
W. Y. Chan*, Texas A&M University - Texarkana

10:30 a.m.
Using Projects to Flip the Differential Equations Classroom.
Corban Harwood*, George Fox University

11:00 a.m.
A Data-Driven Approach to Teaching Modeling with Differential Equations.
Becky Sanft*, UNC Asheville
Anne Walter, St. Olaf College

11:30 a.m.
Connecting Partner Disciplines with Mathematics through Applications in Differential Equations.
Rebecca A Segal*, Virginia Commonwealth University

AMS Special Session
Using Modeling to Motivate the Study of Differential Equations, II
Room 336, BCC, 19 January 2019, 1:00 PM - 3:50 PM

1:00 p.m.
Using Differential Equations to Model Predator-Prey Relations as Part of SCUDEM Modeling Competition.
Anthony Dean Stefan*, Florida Southern College
Zachary David Fralish, Florida Southern College
Thomas Bernard Tyson, Florida Southern College

1:30 p.m.
Opportunities for Community in Using Modeling to Teach Differential Equations at SIMIODE.
Brian J Winkel*, SIMIODE, Cornwall NY USA

2:00 p.m.
Cancer modeling using agent-based models.
Sarah El Jamous*, Arizona State University

2:30 p.m.
Motivating Students with Dynamic Modeling.
S. Lin*, Savannah State University

3:00 p.m.
Fast solvers for Biot model using a multiphysics reformulation.
David Evans*, Morgan State University
Mingchao Cai, Morgan State University

3:30 p.m.
Mathematical modeling and optimal control of Tick Fever.
Blessing Emerenini*, Oregon State University

NSF SPONSORED SIMIODE WORKSHOPS - SUMMER 2019

NSF Sponsored SIMIODE Summer Developer's Workshop

DEMARC -- Differential Equations Model and Resource Creators, George Fox University, Newberg OR USA, 18-21 July 2019 for 20 participants.
4-Day Intensive SIMIODE Developer's Workshop

Those with experience and ideas for writing differential equations modeling scenarios for classroom use are encouraged to apply. DEMARC (Differential Equations Model and Resource Creators) Fellows who are selected for this workshop are fully funded, including travel up to $600, room and board, and a stipend up to $600. Applicants are asked to

provide evidence of successful modeling scenario development and to commit to producing new modeling scenarios during and after the workshop. Travel on July 17 and July 22. Registration details are available here.

**NSF Sponsored SIMIODE Summer Practitioner's Workshop**

MINDE - Model INstructors in Differential Equations, George Fox University, Newberg OR USA, 21-26 July 2019 for 20 participants. 5-Day SIMIODE Practitioners Workshop

Ideal for those who would like to learn more about how to foster a modeling-first approach in the classroom. Workshop includes hands-on demonstration, group discussions, and activities facilitated by experienced faculty. MINDE (Model INstructors in Differential Equations) Fellows selected for this workshop have a $300 registration fee and are provided all materials and room and board for 5 days. Travel on July 21 and July 27. Registration details are available here.

SCUDEM IV 2019 SEEKING LOCAL SITE HOST COORDINATOR
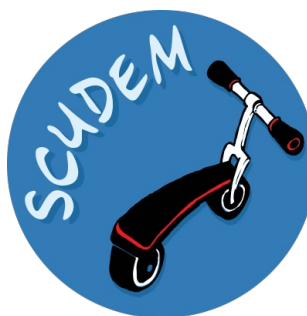
SIMIODE Challenge Using Differential Equation Modeling - SCUDEM IV 2019 is currently seeking local site host coordinators. See our growing list of host sites for SCUDEM IV 2019. Complete details and a Local Site Host Coordinator Guide Book are available with details of host coordinator responsibilities and full SIMIODE support. There is a stipend for host coordinators, namely one half the registration fees arising from $100 US per visiting school team's registrations.

SCUDEM IV 2019 Challenge Saturday takes place on 9 November 2019. SCUDEM IV 2019 actually begins on 1 November 2019 when student teams of three undergraduate or high school students select one of three problems and build a model at their home institution. Problem areas are physics/engineering, chemistry/life science, and social science. Students and their faculty coaches then travel to nearby local host site for Challenge Saturday, a daylong event.

All past problems used and student submissions for each of the previous SCUDEM events can be found here.

For Faculty there is a well-developed Faculty Development Workshop to support the use of modeling in differential equations while students work on an additions and the joy of hearing exciting ideas from students as they judge and give immediate feedback to teams.

For students there is one added issue to their model on which they work in the morning of Challenge Saturday, a fun team MathBowl after lunch, presentations of their model for judging and immediate feedback in the afternoon, and a final awards ceremony.

See complete details on SCUDEM, including results from past events and information on SCUDEM IV 2019.

PUBLISH YOUR CLASS EFFORTS IN SIMIODE

If you are teaching differential equations of some sort you have probably written and assigned projects. Consider publishing your materials online at SIMIODE sing our peer reviewed, double blind referee system.

You can see how to submit your materials here. What you do is important to your students, but it is also worthy of sharing with colleagues and their students. Step up and write up your projects for SIMIODE. You will have an online refereed publication at SIMIODE. You will be pleased to know others are using your ideas, building on your success, and enjoying what you share with your students. So, what are you waiting for? Just do it!

One purpose of SIMIODE is to offer colleagues solid, refereed teaching material on which they can base a modeling first course in differential equations. Thus publishing new ideas and activities for students is a main goal of SIMIODE.

However, it is reasonable to ask yourself, "Why should I prepare, submit, and publish in SIMIODE?" Here we give you many good reasons to publish in SIMIODE. Check them out and see that many fit you. Then join us by sending us your efforts.

FREE ONLINE DIFFERENTIAL EQUATIONS TEXTS

We offer annotated listings of FREE online differential equations texts. This is one of the more popular sections when colleagues visit our site. There are over two dozen such texts. Colleagues have shared their materials in complete text form, often with traditional course structure, as well as rich sets of resources from which to teach. Most texts offered cover the basics of technique and offer exercises. Many offer modeling applications. Your students will appreciate a FREE text and you might enjoy the fresh approaches taken in such presentations. Try it!

This is one of our more popular "landing sites" for visitors to SIMIODE.

Ideally we believe one could save students lots of money by using a FREE online text along with SIMIODE Modeling Scenarios. Make the move for your students and enjoy the excitement of using modeling to motivate learning in your differential equations course.

SIMIODE SOURCES FOR YOUR OWN MODELING SCENARIOS

SIMIODE offers potential modeling scenario ideas. There are hundreds of these! These are materials, thoughts, pointers, summaries, articles, etc. to encourage and support your modeling scenario ideas. You must be registered and signed in to view these resources. Consider these ideas and use them to design your own modeling scenarios for your students and then publish this material in SIMIODE.

Of course, you can publish your own source materials, perhaps ideas you have not been able to get to, but want to or wish to engage with others in producing a Modeling Scenario. Just upload them for all to see. Use the "Start a new Potential Scenario Idea" button and contribute.

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WORDS FROM THE DIRECTOR

SIMIODE is a community which is alive, vibrant, and rich in resources and individual talents to assist colleagues who wish to teach differential equations using modeling to motivate students. There are a number of ways you can add to the community:

Contribute materials -- You can learn more about this at our Author Information section and get even more details once you have signed into SIMIODE. There you will find types of materials and instructions on how to contribute and begin the process leading to publication in SIMIODE.

Register to referee and review submitted materials. -- Good scholarship merits attention and our double-blind, peer-referee system affords quality reviews of submitted materials. Please, visit our Manuscript Management system and register as a referee.

Comment on materials used from SIMIODE using the COMMENTS Tab in each resource.

Post slides from your presentations or talks. -- When you give a talk you can post your slides, details of the talk or meeting, and comments at Resources: Presentations. Now that you have spread the word beyond the SIMIODE community bring it back home for your fellow SIMIODE members to see.

Attend a MAA Contributed Paper Session at MathFest or an AMS Special Session at JMM devoted to modeling in differential equations course work and see what others are doing. Step up after the talk and engage the speaker. You will have a new collegial friend!

Engage your students and you as coach in **SIMIODE Challenge Using Differential Equations Modeling - SCUDEM IV 2019**.

Participate in SIMIODE NSF Sponsored Summer 2019 Workshops to develop materials for doing modeling in differential equations class or learning how to use modeling materials in differential equations class.

When you attend a talk -- on an application of differential equations encourage the presenter to consider sharing these ideas with the SIMIODE community. Encouragement helps young faculty expand their reach.

As always please let us hear from you with your concerns, your news, and your activities. Contact us at Director@SIMIODE.org.

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