SIMIODE Newsletter June 2019

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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, its second year of National Science Foundation funding, and the fifth year of this newsletter.

Please drop us an email to Director@simiode.org and let us know how we can improve SIMIODE and this Newsletter. Or if you have an idea for coverage you would like us to publish in the Newsletter then let us know or perhaps write up an "item" for our next issue. We would love to hear from you.

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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SCUDEM IV 2019 SEEKS HOST SITES

SCUDEM IV 2019 will take place in local sites around the world on 9 November 2019. We are seeking local site host coordinators for this event. SCUDEM, which stands for SIMIODE Challenge Using Differential Equation Modeling, offers teams of three undergraduate or high school students three modeling problems. Each team selects the problem of their choice and works on it for a week before Challenge Saturday, 9 November 2019. Student teams with their coach travel to a local site (your school perhaps) near their home campus for a day of collegial sharing. Here they submit an Executive Summary for judging; work on an additional feature for their problem but do not redo their model; participate with faculty in an active use of SIMIODE Modeling Scenarios during a first portion of a Faculty Development program along with faculty; enjoy the fun of team MathBowl; make a 10 minute presentation of their model results and get immediate feedback on their work by faculty judges. Faculty dig deeper into pedagogical issues of modeling in a second portion of the workshop,

Currently SCUDEM IV 2019 has 58 local site host coordinators around the world, in Latin America, Europe, Asia, Africa, and United States.

Faculty coaches and other members of visiting faculty participate in a two part Faculty Development workshop in which they experience (with students) SIMIODE Modeling Scenarios and discuss using modeling in their differential equations course. During the closing ceremony awards (Outstanding, Meritorious, and Successful) are presented.

Host sites receive a check of one half the visiting teams' $100 US registration fees in support of their hosting, while SIMIODE provides ALL materials for success on Challenge Saturday. SIMIODE provides massive email lists (over 85,000 mathematics faculty members) for local invites, recruiting letter materials, and an attractive flyer which can be personalized to help bring teams to the local campus site for SCUDEM. We have a complete Local Site Host Coordinator Guide and a special Group in SIMIODE for hosts to keep them informed and permit sharing of helpful ideas and approaches.

Team registration opens on 1 September 2019 and runs through 25 October 2019.

Be sure to check out the convincing videos in which students and faculty share their enthusiasm and experience in engaging in modeling with differential equations in SCUDEM events past.

There are no registration fees for SCUDEM IV 2019 in developing countries. This is our way of reaching out and supporting colleagues from these regions.

We invite all to join the Facebook Group - SCUDEM Mathematical Community.
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SIMIODE AT MATHFEST 2019 CINCINNATI OH USA 31 JULY - 2 AUGUST

2019

At Mathfest 2019, Cincinnati OH USA, 31 July - 3 August 2019, SIMIODE is sponsoring a **Contributed Paper Session entitled, "Showcase of Modeling to Motivate Differential Equations,"** There will be two sessions, both on Friday, 2 August 2019 with morning session 10:10 AM - 12 Noon in DECC 233 and afternoon session 1:30 PM - 4:10 PM in DECC 233. Fourteen speakers will be featured in response to the following call for papers.

“Modeling can motivate the learning of differential equations, which is a pivotal STEM course taught in high schools, two-year colleges, and four-year institutions. Student backgrounds and intended majors, faculty backgrounds, and departmental constraints provide for many variations in the course. Modeling can be incorporated into any version to introduce and motivate the study of differential equations and show its broad interdisciplinary. Scholarly presentations will share modeling materials and data collection experiences that generate active, inquiry-oriented learning. Presenters may discuss the value of modeling to themselves as teachers and to their students as learners, as well as assessment techniques and pedagogical successes and challenges.”

Come and join the sessions to hear enthusiastic presentations, learn how you can incorporate more modeling in your differential equations course, and enjoy the sharing. See you there!

SCUDEM Gathering and Information Center for those interested to learn more about SCUDEM IV 2019, 9 November 2019, will be a chance to learn about SCUDEM for you, your school, and your students from 4:30 PM to 6:30 PM, Friday 2 August 2019 in DECC 236. Come and share your questions and experiences.
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SIMIODE IS A COMMUNITY OF PRACTICE - FORUMS FOR CONVERSATIONS

We are pleased to announce that SIMIODE is a Community of Practice in the broad sense as defined by Etienne and Beverly Wenger-Trayner. SIMIODE is more than a set of resources and ideas for using modeling to motivate and teach differential equations. SIMIODE is Community and welcomes conversations, blogs, and exchanges about practices, examples, experiences, materials, stories, student feedback, successes and improvements, and much more. Join us at SIMIODE Community of Practice and engage in meaningful conversations and exchanges. There are several places in SIMIODE in which we offer Forums on member interest topics. Once inside Community of Practice scroll down to Forums (Fora) for SIMIODE Members. Examples include Use of Modeling Scenarios and Student Conversations about Modeling in Differential Equations Course. These and other Forums can be found in the Forum Page as well.

Also there may be forums found in your Groups, for example in the Teachers Group (our biggest group) we just added a Forum to other forums present called, "Modeling with Numerics" about fostering an exchange of ideas and experiences in using modeling to motivate numerical methods and programming for post calculus coursework, particularly differential equations. You can find Group defined Forums in your Dash Board once inside a Group of interest under Forum. Registered members can form a Group, invite members, and create their own Forums OR contact Director@simiode.org about forming a broader Forum for others to visit.

We have several ways to grow a Community of Practice. One way of doing so is introducing yourself to the community by making your profile rich in detail about your interests and background with use of tags and contact information. In SIMIODE one can search for colleagues by name or by interests using information you put on your Profile in the form of tags. We encourage folks to put themselves out there for others to find them and build connections. It could be a grad school buddy, a colleague from a former school, a person with the same advisor, a neighboring school associate, a friend, etc. When you make contact then pick up a conversation about uses of modeling in differential equations, the reason you are in SIMIODE!
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SIMIODE SESSIONS AT JOINT MATHEMATICS MEETINGS 2020 ANNOUNCED

SIMIODE has been granted **two paper sessions AND a Minicourse** at the AMS/MAA Joint Mathematics Meetings in Denver CO USA, 15-18 January 2020.

We have been granted a fourth (in a row) **AMS Special Session** entitled, "Wall to Wall Modeling Activities in Differential Equations Courses." This session is organized by Janet Fierson, La Salle University, Therese Shelton, Southwestern University, and Brian Winkel, SIMIODE. The essence of the session proposal is here, "Presenters will share and demonstrate the modeling activities used in their own differential equations or modeling courses, thus engaging the audience as participants. Attendees will have the opportunity to experience these activities from the perspective of students learning the relevance of differential equations to realistic situations. Both pedagogical and technical details will be presented, and audience reflection will take place." Abstracts are accepted until Tuesday, September 17, 2019 12:00 AM Eastern Standard Time at the JMM AMS Abstract site.

We have also been granted an **MAA Contributed Paper Session** entitled, "Modeling-First Inquiry-Based Course Activities." This session is organized by Ben Galuzzo, Clarkson University, Corban Harwood, George Fox University, and Brian Winkel, SIMIODE. The essence of the session proposal is in this paragraph, "We invite scholarly presentations of in-class activities, projects, and/or data collection experiences that generate active, inquiry-oriented learning across the mathematics curriculum. The diversity of presented modeling implementations benefits the community through shared resources, support, and new perspectives. Presenters are encouraged to discuss the value of modeling to themselves as teachers and to their students as learners, as well as assessment techniques and

pedagogical successes and challenges." More details will be forthcoming in the MAA JMM 2020 web site on submission of abstract procedures.

Minicourse #10: Wall to Wall Modeling Scenarios for Differential Equations - yup same title as AMS Special Session!

Part A: Thursday, 16 January 2020, 9-11 AM, Room 704 with Part B: Saturday, 18 January 2020, 9-11 AM, Room 704

This minicourse offers participants active experience in using eight Modeling Scenarios from the double-blind, peer reviewed materials in the resource collection found at the SIMIODE Community of Practice. Time will be devoted to reflection on use in participants' home setting. We offer this minicourse in support of colleagues who wish to experience modeling activities which can then be used in teaching their differential equations courses. The leadership team of accomplished authors and teachers will demonstrate, using 8 Modeling Scenarios from the SIMIODE repository, how one can effectively use a modeling approach in a differential equations course through the classroom simulation the minicourse will offer. In the process of doing the specific modeling activities during the minicourse we will share with participants information and insight into the many resources of the SIMIODE community. Through minicourse participation colleagues will gain confidence in their ability to bring modeling into their own classroom to teach differential equations and expand their network of like-minded colleagues. Registration will be open in the fall.
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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 in SIMIODE using our peer reviewed, double blind referee system.

SIMIODE maintains a double-blind, peer-reviewed process for quality online publication of Modeling Scenarios and Technique Narratives. However, we encourage authors to submit their ideas at any stage of development and/or class projects for immediate feedback of a less formal nature. We will render constructive support and encouragement as well as technical feedback. In the past the SIMIODE Director, Brian Winkel, as Founding Editor of the journal *PRIMUS*, found this to be a very good way to foster confidence, help prospective authors contribute to the broader community, and get their ideas published. Please drop us a note with your ideas and/or materials to Director@simiode.org. We will respond quickly!

Recently, Virgil Ganescu, York College of Pennsylvania, York PA USA, published a rich Modeling Scenario 3-067-S-RLCSeriesCircuit in which he introduced the reader to an exceptionally good circuit building software, Multisim, which is FREE for use to build the second order linear ordinary differential governing equation of a small signal RLC series AC circuit. Students then solve the equation analytically and the results are compared with the data acquired from analyzing the numerical model of Multisim.

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.
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COMMENTS HELP CREATE COMMUNITY AT SIMIODE

For each Resource posting in SIMIODE community members have the opportunity to post COMMENTS. This is strongly encouraged as it will build conversations which will connect colleagues, improve material, and foster community. Any posted Comment will be emailed to the author of that resource and conversations can then begin.

Giving feedback, reactions, and corrections to authors is very important for the individual author and the wider SIMIODE community. If you visit and scan/read or actually use a Modeling Scenario or Technique Narratives please offer comments. You may even wish to upload a new resource which has significant added-value. If so then contact Director@simiode.org to inquire how you can do this. We would welcome such efforts.
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CALL FOR TECHNIQUE NARRATIVES FOR SIMIODE

We publish more and more Modeling Scenarios all the time. Indeed, these are the core of support material for colleagues planning to do more modeling in support of learning differential equations.

It is also important to offer colleagues and their students what we call Technique Narrative activities. These are closer to the traditional material of solution strategies and methods offered in differential equations courses and may help faculty in a more comfortable transition to using modeling in their teaching. SIMIODE offers a small but growing list of Technique Narratives. As with Modeling Scenarios, we have a Student Version in which the STATEMENT of the problem is offered with supporting materials and we have the Teacher Version in which COMMENTS are offered to assist in planning, teaching, and carrying out the modeling activity.

A good example of a Technique Narrative is found in 1-002-S-Text-IntegratingFactor. Here the solution method of Integrating Factor is illustrated and exercises are placed in the context of science and engineering applications so the student can see not only the technique, but the worth of using the technique in context.

All Technique Narratives are FREE, downloadable, and customizable under the most generous Creative Commons license. Visit here to see them all. The list is small, too small, so we request that you share your approaches to solution methods through writing them up for publication, just as you would a Modeling Scenario. They are fully searchable by topics and area of interest to you.
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CONSIDER REFEREEING MATERIALS SUBMITTED TO SIMIODE.

The high quality material in SIMIODE needs scrutiny, review, and collegial suggestions for improvement. Please consider refereeing materials submitted to SIMIODE for online publication. We use a double blind, peer reviewed manuscript management system to insure high quality reviews. You can sign up as a referee to review materials and help make quality SIMIODE offerings for users at our SIMIODE FastTrack Page. Thank you.
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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. If you are using one of these texts then please prepare a review for publication and send it to Director@simiode.org for others to know about how you use the work and save students money! Or you can add your thoughts to the Comments tab at each text's listing. Other will value what you have to say, so take this request to heart and share your thoughts and experiences.

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.
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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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SIMIODE IS A 501(C)(3) TAX EXEMPT ORGANIZATION - PLEASE SUPPORT US

SIMIODE is a 501(c)(3) tax exempt organization and can accept tax deductible contributions from individuals, corporations, and foundations.

Think of your differential equations course and how applications and modeling would have been so beneficial to motivate you and your fellow students. SIMIODE is your chance to support this approach for students now. You can see students value this approach in our SCUDEM videos Join us and contribute your support, financially and intellectually.

As a mathematics education organization we are open to receiving public support. In fact, we need this support to exist, so please contribute. You can contribute financial support for SIMIODE in whatever amount you feel appropriate at Donate. See our Mission Statement for reasons why you should support SIMIODE. All contributions are tax-deductible. For ANY contribution we will send you a letter of appreciation, acknowledging your contribution, for tax purposes. Please provide your email for this letter. Thank you.

You may confirm our NonProfit status at the official listing of SIMIODE in the IRS Organization List of NonProfit Organizations.
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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.

Visit our SIMIODE Blog for thoughtful commentary or form your own blog. .

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.

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!

Attend one of our **SIMIODE Workshops and Minicourses** at national mathematics meetings.

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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