SIMIODE Newsletter April 2018

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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 fifth year as a community and its fourth 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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NATIONAL SCIENCE FOUNDATION AWARDS SIMIODE THREE YEAR $450,000 GRANT

The National Science Foundation has awarded SIMIODE a three year grant for $450,000 to promote the use of modeling in motivating and teaching differential equations in high schools and undergraduate institutions.

NSF Funds will support Developer Workshops and Practitioner Workshops each summer in 2018, 2019, and 2020. SIMIODE leadership will be supported for travel to national and regional meetings to organize contributed paper sessions, lead minicourses and workshops, and develop community through personal interactions. Further, funds will be used to enrich, enhance, expand, and enable new programs of the SIMIODE web community on line and to assess and evaluate the effectiveness of the workshops and the overall SIMIODE program to help faculty to use modeling in teaching differential equations coursework.
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NSF SIMIODE DEVELOPER WORKSHOPS AND PRACTITIONER WORKSHOPS

SIMIODE will conduct NSF sponsored SIMIODE Developer Workshop and SIMIODE Practitioner Workshop in the summer of 2018.

The Developer Workshop will host 20 faculty who will produce teaching materials - Modeling Scenarios and Technique Narratives. The 2018 SIMIODE Developer Workshop will be held at Manhattan College, New York NY, from 15 - 21 July 2018.

The Practitioner Workshop will afford 20 faculty the opportunity to learn about teaching in a modeling first differential equations approach through their own engagement as teacher to fellow workshop personnel using SIMIODE teaching materials; mentored discussions on how to incorporate modeling; collaborative efforts to build scaffolded and more intensive modeling efforts in individual coursework; support for authoring their own materials through SIMIODE's double-blind, peer-reviewed online publication system; presentation on how to prepare article for publication in scholarly journals; and ongoing conversations during the academic year in support of these new teaching approaches. The 2018 SIMIODE Practitioner Workshop will be held at Manhattan College, New York NY, from 22 - 28 July 2018.

Both workshops will provide room and board in Manhattan College's air-conditioned private room dormitories on the beautiful campus in Riverdale NY at the end of the 1 Train Line in the city subway with workshops sessions in the college's elegant conference center. The Developer Workshop will have a modest stipend for contributors while the Practitioner Workshop will have a registration fee of $300. Participants from both workshops will have an opportunity for a day and night on the town in New York City - theatre, concerts, museums, culture, sight-seeing, people watching, urban transportation, and experiencing the bustle of this amazing city during midweek Wednesday break after lunch. Think Times Square, Broadway, Statue of Liberty, Lincoln Center for the Arts, Carnegie Hall, National September 11 Memorial and Museum, Empire State Building, Bronx Botanical Gardens or Zoo, Staten

Island Ferry, and much more.

Workshop participants will be able to bring along a guest to share the dorm room at $48/night so the guest can experience New York City while the workshop participant enjoys the benefits of the respective workshop.

See DEMARC - NSF SIMIODE Developer Workshop and MINDE - NSF SIMIODE Practitioner Workshop for complete information and application.
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SCUDEM FOR YOU AND YOUR STUDENTS

SIMIODE sponsors a modeling competition specific to the pivotal STEM course, differential equations. We call it Student Competition Using Differential Equations Modeling (SCUDEM). After our very successful inaugural SCUDEM on 14 October 2017 at Mount Saint Mary College, Newburgh NY USA, we offered SCUDEM at sites around the country and beyond on 21 April 2018. We will report results of SCUDEM 2018 soon and make notes on them in our next Newsletter

We offer a SCUDEM 2017 video in which students and faculty share their enthusiasm for using modeling in solving solve real problems to learn differential equations. Student interviews are very, we mean VERY, convincing as to the value of this modeling competition in their learning and growth in applying the mathematics they are learning. We will have a comparable video from SCUDEM 2018 as well.

At the SCUDEM 2017 site we offer complete results including the statement of the posed problems, the additional issues offered on Competition Saturday, results with all student submissions, award information, a way cool video, a PowerPoint overview of the event, MathBowl fun competition. Try it. You will enjoy it! You can find answers in the Teachers Group Resources at SIMIODE.

We will be announcing **SCUDEM 2019 for 20 April 2019** and sending out invitations to serve as a local host site for the competition in Fall 2018 and then issue a call for teams during the registration period, 1 February - 1 April 2019. This competition is for three member teams of students. SCUDEM takes place over a week-long period which will begin with teams selecting one of three modeling problems on Friday, 12 April 2019, at each team's individual home campus, and culminates on Competition Saturday, 20 April 2019, at 9:00 AM at a nearby regional host site in the United States and beyond.

Complete information can be found at SCUDEM.
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SIMIODE IS A TAX EXEMPT ORGANIZATION

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 2017 video. 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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WHAT ARE YOU WAITING FOR? PUBLISH IN SIMIODE.

If you are teaching differential equations of some sort you have probably written and assigned projects. Consider publishing your materials online using 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.
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PUBLISHING YOUR STUDENTS' PROJECTS

As spring semester draws to a close consider encouraging your students to write up their differential equations course projects as a Modeling Scenario for other students. Learning how to turn an investigation into a pedagogical opportunity for fellow students will be a

great learning experience.

Encourage and enable your students to submit these excellent projects for publication in SIMIODE. You can see how to submit materials here.

We have a place for publishing completed student projects so others can see the work of your best and finest. Faculty can see what is possible, and perhaps use these ideas to design projects of their own. We call these Potential Scenarios.

Also your students can submit their project when converted to teaching material to our Manuscript Management site for refereeing, editing, and acceptance. They can also submit supplemental materials, e.g., video, spreadsheet, data sets, computer algebra files, posters, PowerPoint slides, extra pdf files.

We believe quality student work is worthy of display, of sharing, and of praise. Do this for your students. Help them publish their good work at SIMIODE.
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COMMENTS HELP CREATE COMMUNITY AT SIMIODE

For each posting in SIMIODE community members have the option to post COMMENTS. This is strongly encouraged as it will build conversations which will connect colleagues, improve material, and build community. Any posted Comment will be emailed to the author of that resource and conversations can then begin.
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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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SIMIODE EVENTS AT MATHFEST 2018 IN DENVER CO USA - 1 - 4 AUGUST 2018

SIMIODE is sponsoring a **Minicourse: Initiating, Designing, Building, and Using Modeling Scenarios for Teaching Differential Equations**, organized by Brian Winkel, SIMIODE, Cornwall NY; Eric Sullivan, Carroll College, Helena MT; Lisa Driskell, Colorado Mesa University, Grand Junction CO; and Audrey Malagon, Virginia Wesleyan University, Virginia Beach VA. Details will appear in Spring MAA FOCUS issue.

Description: This minicourse offers experienced guidance and hundreds of rich sources for initiating, designing, and building teaching materials for teaching differential equations using mathematical models from a wide variety of cognate disciplines. We offer this minicourse in support of colleagues who wish to create teaching materials for teaching differential equations though modeling. The leadership team of accomplished authors will discuss how they prepare and produce modeling scenarios and then help participants focus on projects of their own creation. We will share many sources for constructing teaching materials, point to immediate possibilities available to participants, and help them gain confidence in their ability to compose their own lessons. Through active, hands-on, small group work participating faculty will experience using modeling to teach differential equations from day one as but one example of the kind of material they can produce.

To apply for this (or other) Minicourse go to MAA MathFest Minicourse page.

SIMIODE is also running a **Contributed Paper Session: Modeling-Based Teaching and Learning in Differential Equations**, organized by Brian Winkel, SIMIODE, Cornwall NY; Lisa Driskell, Colorado Mesa University, Grand Junction CO; and Audrey Malagon, Virginia Wesleyan University, Virginia Beach VA. Details will appear in Spring MAA FOCUS issue.

Description: This session features talks centered around modeling-based teaching and learning in differential equations courses. Presentations may include descriptions of modeling-based scenarios developed for these courses as well as shared experiences of using modeling in a course, from a one-time project to redesigning an entire course. We welcome speakers who are just beginning to use this method along with those with more experience. We are particularly interested in talks which feature real data (either collected or taken from the literature) and a full modeling process for students, i.e. stating assumptions, making identifications, creating a differential equation model, developing solution strategies,

performing parameter estimations, rendering model validation, iterating this process, and communicating the results. Some evidence of the success of individual approaches should be offered.

To submit an abstract for MAA MathFest 2018, go to www.maa.org/mathfest/abstracts and follow the instructions found there. The deadline for submission of abstracts is 30 April 2018. Early submissions are encouraged.
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LOOK FOR CALL FOR PAPERS ON MODELING COMPETITIONS AT JMM 2019

COMAP sponsored Mathematical Contest in Modeling (MCM), Interdisciplinary Contest in Modeling (ICM), and High School Mathematical Contest in Modeling (HiMCM), and SIMIODE sponsored Student Competition Using Differential Equations Modeling (SCUDEM) are team competitions in which students apply the mathematics they know to solve a real world problem. Students routinely report learning more in this 4-day period than any other period during college, and find it one of the most rewarding experiences of their undergraduate careers. Students point to this experience in interviews as an example of working in a team environment, meeting a deadline, and as evidence of their problem-solving ability. The value of participating is worth much more than the four days of work, making this an impactful experience for faculty advisors as well.

This MAA Contributed Paper Session is aimed at faculty who wish to begin advising teams and for current advisors to share strategies for student success. We invite presentations focused on building and supporting student teams, developing mentor relationships for faculty, and presentations elaborating the judging process in order to help advisors better prepare student teams. We especially encourage student teams who have achieved a "Meritorious" or higher rating to report on their contest experience.

The publication of this Call for Papers will appear in MAA's *FOCUS* and *Notices of the AMS*.
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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!

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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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.

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.

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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