

SIMIODE Newsletter October 2018

Volume IV Number 5

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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 FUNDS SIMIODE THREE YEAR GRANT



The National Science Foundation Division of Undergraduate Education has awarded SIMIODE a three year grant (15 March 2018 award date) to promote the use of modeling in motivating and teaching differential equations in high schools and undergraduate institutions. We are pleased at this vote of confidence in SIMIODE as reflected in National Science Foundation funding and we will use the funds wisely to spread the word of using modeling in teaching differential equations.

NSF Funds will support a second year of Developer and Practitioner Workshops this July at George Fox University, Newberg OR USA, and will support comparable workshops in July 2020 at Virginia Wesleyan University, Virginia Beach VA USA. 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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FACEBOOK GROUP - SCUDEM MATHEMATICAL COMMUNITY

We invite all to join the [Facebook Group - SCUDEM Mathematical Community](#). See the joy in SCUDEM for students at various locations for SCUDEM II 2018 held on 21 April 2018 and SCUDEM III 2018 held on 27 October 2018. Also check out our videos in which student and faculty participants explain the personal and growth significance of SCUDEM at [SCUDEM web site](#).

SIMIODE takes the challenge of bolstering mathematical inquiry, reasoning, and application seriously. We encourage group members to share compelling assignments, questions, problem ideas, and modeling scenarios using differential equations with the group. We are interested in ones they have worked on or ones they think would be interesting and need more efforts. All are welcome. So please join us as we continue to grow and share the incredible stories of students and faculty across the world who enjoy exciting applications of differential equations.

SCUDEM IV 2019 takes place on 9 November 2019. We shall keep you informed of details, but if you wish to host you can contact us directly at Director@simiode.org. Details will be posted in December 2018.

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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

I think of your differential equations course and now 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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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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RECENT PUBLICATIONS OF MODELING SCENARIOS IN SIMIODE

Author, Jean Marie Linhart, says in her abstract to her Modeling Scenario [Ballistic Modeling-Sponge Dart](#) "The goal of this project is for students to develop, analyze, and compare three different models for the flight of a sponge dart moving under the influences of gravity and air resistance."

[Humans vs. Zombies](#) is the subject of the Modeling Scenario authored by Hope McIlwain, Mercer University, Macon GA USA. She got the idea from a Zombie game played on campus by the students. Jue Wang of Union College, Schenectady NY USA, authored another [Zombie Modeling Scenario](#), [ZombieGameHvZ](#). Dr. Wang authored four exciting Modeling Scenarios. Congratulations to her!

Victoria Rayskin, Tufts University, Medford MA USA, produced a very interesting Modeling Scenario on [Internet Platform Users](#). Dr. Rayskin says in her abstract, "A model estimating the volume of users interacting through a two-sided Internet platform (allowing interaction of two types of users) will teach students how to analyze a 2-dimensional dynamical system. The model will illustrate how the question of existence of closed orbits can be investigated."

[Drones Heading Home](#) is the subject of a Modeling Scenario produced by Richard Spindler, SUNY Plattsburgh, Plattsburgh NY USA, and then modified by two participants from the SIMIODE MINDE Workshop, Eric Stachura, Kennesaw State University, Kennesaw GA USA and Robert Krueger, Concordia University, Saint Paul, St. Paul MN USA, into a new Modeling Scenario [Delivery of Drone Packages](#).

Mehdi Hakim-Hashemi of Mathematics, Normandale Community College, Bloomington MN USA authored several Modeling Scenarios, one of which was, on the [Poisson Process](#) in which, ". . . students learn to derive the probability density function (pdf) of the Poisson distribution and the cumulative distribution (cdf) of the waiting time. They will use them to solve problems in stochastic processes."

These Modeling Scenarios were produced in our NSF Funded Faculty Developer Workshop (DEMARC) at Manhattan College, Riverdale NY USA in July 2018. You can look for them in [What's New](#) under Resources in our Main Page Banner. Check them out.

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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 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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COMMENTS HELP CREATE COMMUNITY AT SIMIODE

For each Resource 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.

Giving feedback, reactions, and corrections to authors is very important for the individual author and the wider SIMODE 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 SIMODE

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. SIMODE 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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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 SIMODE.

Ideally we believe one could save students lots of money by using a FREE online text along with SIMODE 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

SIMODE 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 SIMODE.

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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COMAP - MCM AND ICM COMING SOON - AROUND THE WORLD

The Consortium for Mathematics and Its Applications (COMAP) is a source for all levels grade school high school, and higher education of modeling materials - books, modules, videos, and several [international modeling competitions](#) (MCM and ICM) for high school and undergraduate students.

MCM: The Mathematical Contest in Modeling and **ICM:** The Interdisciplinary Contest in Modeling

MCM is a contest where teams of undergraduates use mathematical modeling to present their solutions to real world problems.

MCM will take place January 24 - 28, 2019. Advisors can [register teams online](#) now. Note that we have made a number of changes in the contest policy and registration process since last year; all advisors should read the [registration instructions and contest rules](#) thoroughly.

ICM, the Interdisciplinary Contest in Modeling, is a part of MCM. Advisors wishing to register a team for ICM should register for MCM via this web site, and should choose "problem D, problem E or problem F" when selecting the problem for their team to solve.

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WORDS FROM THE DIRECTOR

SIMODE 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

Contribute materials -- You can learn more about this at our [referee 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.

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!

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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