

Volume VII Number 1

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SIMIODE EXPO 2021 INTERNATIONAL VIRTUAL CONFERENCE- 12-13 FEBRUARY 2021

SIMIODE will offer a virtual conference, SIMIODE EXPO 2021, 12-13 February 2021, with minicourses, contributed paper sessions, panels, and more for faculty AND students. REGISTER NOW .

Hundreds from around the world are attending this intimate, content packed conference, focused on teaching differential equations with modeling, and MUCH MORE! This is an opportunity to hear of the successes of others and share your own experiences in small group sessions and one-on-one ZOOM conversations. Registration is low, \$45 US for non-students and \$25 for students - and no travel costs, just sit tight at home and enjoy! The conference will use the powerful and extraordinarily friendly hosting software platform, mathdept.org, which will permit remarkable interactions and offer all but the smell of coffee and donuts!

REGISTER NOW for this virtual international conference. Folks have already registered from Panama, Israel, United States, Viet Nam, Nigeria, Ireland, Ghana, India, Philippines, Norway, Colombia, Canada, Portugal, Czech Republic, Pakistan, and Honduras. Come make new friends.

Experience many great sessions and minicourses, fun MathBowl, informal social groups, your own meeting avatar, and much more for students and non-students. Here are some samples.

- Eight Minicourses covering broad areas with details, examples, and engagement for you.
- Mentewab Ayalew, Spelman College, shares her insight, "Integration of biology, mathematics, and computing in the classroom through the creation and repeated use of transdisciplinary modules."
- Michael Naylor of abacaba and TEDxTrondheim - inspired by mathematics and art fame talks about "How mathematics inspires art," while Sofya Kerzhner, Baltimore City Community College, invites to art in "Unlocking Creativity and Enhancing Flexible Thinking through Art."
- Keynotes from Matt Boelkins, Editor PRIMUS, on "More Linear Algebra" and Brian Macdonald, ESPN Sports, Data Scientist, "An overview of data science problems in the sports industry".
- Ameer Evans Godwin, Institute for the Study of Knowledge Management in Education (ISKME), opens our eyes and minds about "Accessibility of Digital Resources: A framework for the evaluation of STEM OER."
- Stop in on Poster Sessions and chat about individual progress.
- Hear six student career path talks from math folks involved at General Motors, actuary science, Johns Hopkins Applied Physics Labs, National Security Agency, Boeing, and Stanford University Economics.
- Jennifer Czochoer, Texas State University, tells us about "What we can we learn about students that grades won't teach us?"
- Friday night fun MathBowl with challenging questions and some pun groaners!
- Industrial mathematics from Boeing and General Motors.
- Anthony Stefan, Florida Institute of Technology, tells all in "Participating in SCUDEM - SIMIODE Challenge as Student, Coach, and Host."
- Finite elements, Laplace transforms, stochastic processes, delay differential equations, and mobile apps to enhance learning DEs - all on the program.
- Tracy Weyand, on the faculty at Rose-Hulman Institute of Technology, moderates informal faculty discussion, "On how to get started with modeling in coursework."
- Ian Ebert, a student at San Jacinto College, Pasadena TX USA, offers informal student discussion, "On sharing experiences and reactions to using modeling in learning mathematics with modeling in coursework."
- Terrance Pendleton, Drake University, is up front and direct in saying, "Show Me the Data-- Examples (and Resources) for Data-Driven Modeling."
- Carrie Diaz Eaton, Bates College, Erin Bodine, Rhodes College, and Joanna Wares, University of Richmond lead panels on "Teaching Disease Modeling with Social Justice" AND "Teaching Social Justice in the Mathematics Classroom."

- Trefor Bazett, University of Victoria, producer of YouTube many videos talks about, "Opportunities and Challenges Engaging a Global Audience" while Dina Yagodich, Frederick Community College, talks about her hundreds of videos for student use and learning.
- Hear Beverly West of CODEE Journal and Paul Zachlin of OhioLink DE - offer great sources for teaching ideas.

Do not miss out! REGISTER NOW for this international conference - SIMIODE EXPO 2021, 12-13 February 2021. See you on 12 February 2021 for opening session at 3:30 PM Eastern US Time. All sessions will be recorded for conference attendees for viewing and revisiting after the conference so you will not have to miss anything.

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SIMIODE OFFERS SUMMER 2021 NSF WORKSHOPS DEMARC FOR DEVELOPERS AND MINDE FOR PRACTITIONERS

SIMIODE will offer **NSF Workshops for DEMARC for Developers and MINDE for Practitioners**

SIMIODE Developer's Workshop (DEMARC)

DEMARC -- Differential Equations Model and Resource Creators -- Workshop will meet virtually (via Zoom) for four Tuesdays in June in Summer 2021. This workshop aims to help those experienced in teaching modeling-based differential equations create shareable classroom resources which will be published in SIMIODE. DEMARC Fellows will receive a \$400 stipend and are provided all materials. The workshop will meet Tuesdays in June (June 8, 15, 22, 29) from 1 PM - 4 PM Eastern US Time.

To apply to be part of this workshop, please submit the following to Director@simiode.org by 1 May 2021.

- Letter of interest describing your experience using modeling-based pedagogy and a commitment to attend all four weeks of the workshop
- Curriculum Vita
- Sample of a classroom modeling project or activity you have created
- At least two ideas for new modeling activities you hope to develop in the workshop

SIMIODE Practitioners Workshop (MINDE)

MINDE -- Model INstructors in Differential Equations -- Workshop will meet virtually (via Zoom) over four days, 7-8, 10-11 June 2021. Each day we will meet 11:00 AM - 1:00 PM and 2:00 PM - 4:00 PM Eastern US Time, with a 2-hour break in the middle.

MINDE -- Model INstructors in Differential Equations workshop is a "practitioner's workshop", ideal for those who would like to learn more about how to foster a modeling-first approach in their differential equations class. The workshop experience includes "hands-on" demonstrations, group discussions, and activities facilitated by experienced faculty. This MINDE Workshop enables participants to engage with colleagues in discovering, experiencing, and planning to use innovative modeling opportunities in support of their teaching methods. MINDE Fellows selected for this workshop will receive a stipend of \$200 and are provided all materials.

To apply to be part of this workshop, please submit a Curriculum Vita and a Letter of Interest to Director@simiode.org by 1 May 2021. In the letter you should describe the following:

- your experience teaching differential equations,
- the primary pedagogy you have been using,
- your interest in using modeling-based pedagogy, and
- a commitment to attending all parts of the workshop

Workshop attendees have appreciated the experience and gone on to be leaders.

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SIMIODE ONLINE TEXT DIFFERENTIAL EQUATIONS: A TOOLBOX FOR MODELING THE WORLD

Kurt Bryan, Rose-Hulman Institute of Technology, Terre Haute IN USA, is authoring a SIMIODE online, hyperlinked text, *Differential Equations: A Toolbox For Modeling The World*, in SIMIODE which will bind rich modeling resources so faculty can teach a complete differential equations course motivated by modeling and students can save a bundle of money! Dr. Bryan (with co-author Tanya Leise, Amherst College, Amherst MA USA) has authored several pieces in *SIAM Reviews* over the years. For example they explain [The \\$25,000,000,000 Eigenvector: The Linear Algebra behind Google](#). Dr. Bryan has also authored (with Allen Broughton, Rose-Hulman Institute of Technology) *Discrete Fourier Analysis and Wavelets - Applications to Signal and Image Processing*.

The SIMIODE online text will have the traditional topics flow, but will be rooted throughout in modeling as a motivation and teaching approach with links to SIMIODE and other resources. By 15 May 2021 there will be full complete version online for consideration in Fall 2021 use in your course. You can get access to the **preliminary version** through registration for the SIMIODE EXPO 2021, 12-13 February 2021 conference or writing to Director@simiode.org with your personal request. So for now, know there will be a very affordable and solid text - for \$45 US - that will motivate learning differential equations through modeling. The text will include traditional exercises and solutions in addition to rich motivating modeling activities from SIMIODE and elsewhere. All other resources in SIMIODE will remain FREE as Open Educational Resources (OER) while this text will bring together the modeling approach SIMIODE supports, weaving together and binding the freely available SIMIODE resources. In addition, modeling activities, exercises, and projects, along with rich sections on dimensional analysis, parameter estimation and system identification, and control theory, for example, will point the way to applications for students while motivating them to see the value and context of differential equations in operation.

SCUDEM V 2020 RESULTS AND POSTING OF OUTSTANDING VIDEOS

SCUDEM V 2020 (SIMIODE Challenge Using Differential Equations) was offered in the Fall of 2020. Teams of three students signed up from August through October and from 23 October - 14 November 2020 each team produced a ten-minute video in which they modeled **one of three problems posed** with differential equations. Students could present themselves as a team from one school or students could register and SIMIODE put them together in teams with volunteer coaches. There were 95 faculty and industry coaches, 502 students, and 380 judges from around the world engaged in SCUDEM V 2020 and we thank all for their participation.

Of the 130 teams who submitted a video 27 received an Outstanding Award, 44 received a Meritorious Award, and 59 received a Successful Award.

The break down on problems is as follows:

- A (42) Outstanding-4, Meritorious-21, Successful-17
- B (53) Outstanding-11, Meritorious-20, Successful-22
- C (35) Outstanding-12, Meritorious-3, Successful-20

We have placed all 27 Outstanding Award team videos along with complete statements of the three problems posed at our [SIMIODE YouTube channel](#). SIMIODE VI 2021 will be conducted in similar manner with registration in August - October 2021 and the Challenge work time on the problems and to produce the team video will be 23 October - 15 November 2021.

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STARTER KIT IN SIMIODE YOU MIGHT HAVE MISSED RECOMMEND TO YOUR COLLEAGUES

SIMIODE offers a [StarterKit](#) of materials proven to work in the classroom. These Modeling Scenarios have been used by thousands of teachers to engage students in learning differential equations through modeling. This is where you refer your colleagues to if you want to show them materials they can use to try modeling in their classroom. You too might see some other materials you could use either early on in your course or once you are off and doing modeling. Give them a look see and make them part of your teaching!

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SIMIODE SOURCES FOR YOUR OWN MODELING SCENARIOS

SIMIODE offers [potential modeling scenario ideas](#). There are now over 500 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 REMOTE TEACHING MODULES OFF THE SHELF ONLINE INSTRUCTION

SIMIODE offers [SIMIODE Remote Teaching Modules](#) consisting of off the shelf, ready to use classroom materials which include videos for teacher and student in support of teaching and learning with complete materials for teaching and assessing results. Further, there are [Questions and Answers](#) from our OnLine 13 August 2020 SIMIODE Panel and Q&A on Remote Teaching Modules. This material is available to registered members of the Teacher Group in SIMIODE. Registration is free in SIMIODE so join the Community of Practice and benefit from these resources.

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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. More and more colleagues are accepting our invitation for sharing and publishing their teaching materials in SIMIODE for others to enjoy. Join in with us!

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!

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 your new ideas and activities for students is a main objective of SIMIODE so others can see your fine work and engage their own students in similar manner. 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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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.

Post slides from your presentations, classes, 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. 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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