

## Volume VI Number 5

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### SCUDEM V 2020 - VIRTUAL - REGISTRATION OPEN NOW THROUGH 15 OCTOBER 2020

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SIMIODE Challenge Using Differential Equation Modeling - SCUDEM V 2020 is going virtual and registration is NOW Open for Students, Coaches, and Judges.

**We are particularly in need of faculty judges.** Please [sign up](#). We will ask you to view three 10-minute videos, score them using a provided rubric, and write constructive feedback. This is about 1 hour contribution to the growth of students from around the world. Please help.

We ask faculty to invite their students NOW to [register for SCUDEM V 2020](#). Students can register as a team or individually. In the latter case SIMIODE will put students and coaches together from around the world to work on a model and make new friends and life-long mathematical colleagues.

Key features include - **opportunity to work together with student team members and faculty coaches from around the world** and more:

- Teams of three high school or undergraduate students will select one of three area problems (physics/engineering, chemistry/life sciences, humanities/social science) to work on during the Challenge Period 23 October -14 November 2020 and upload their team's 10 minute video presentation for judging.
- [Helpful materials for students](#) prepared by SIMIODE student interns and former SCUDEM participants is available.
- Teams can consist of students from one school or many schools. SIMIODE will facilitate team formation and coach assignment from individual student and mentor/coach registration.
- SIMIODE offers opportunities to meet colleagues from around the world in team/coach pairings from individual registrations.
- [Faculty and graduate students can volunteer](#) to coach/mentor teams as well as judge to score and give constructive feedback to teams.

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. You can see all the previous events' problems and all student submissions for each year of SCUDEM at [SCUDEM V 2020](#), e.g., [SCUDEM IV 2019 results](#).

There are no registration fees for SCUDEM V 2020 in developing countries and there is a modest \$10 US individual registration for all other students.

We invite all to visit and join the [Facebook Group - SCUDEM Mathematical Community](#) to see more joy in modeling with differential equations.

See the results of our [SCUDEM Lite 2020](#) in which 8 teams produced impressive videos for judging this March in a prelude to SCUDEM V 2020 going virtual.

In our 12 July 2019 Blog we highlighted the results from a recently published article, "Building mathematics self-efficacy of STEM undergraduates through mathematical modelling," in the *International Journal of Mathematical Education in Science and Technology*, in which the authors conclude that SCUDEM increases students' self-efficacy in mathematical modeling. Do SCUDEM for your students!

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### SPECIAL CALL FOR VOLUNTEER JUDGES FOR SCUDEM V 2020

We appeal to faculty and graduate students to help judge team video submissions for SCUDEM V 2020. All submissions are in English. We ask each judge to view three team 10-minute videos of their presentation of their model submission, give them a score (using easy rubric), and offer constructive comments to the teams. This is about one hour of your time - a good investment of that time. [Information on judging](#) is available with [form for registration as Judge](#) also provided. This is an opportunity to help young students from around the world grow in their modeling with differential equations skills and to see the future through these bright and energetic students' work. Please volunteer and enjoy the experience, knowing that you are doing something good for these students. Thank you.

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## **SIMIODE RELATED ACTIVITIES AT THE VIRTUAL JOINT MATHEMATICS MEETINGS**

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The [Joint Mathematics Meetings](#) of the MAA and AMS will be held virtually on 6-9 January 2021. This will be an opportunity to join in the world's foremost mathematics gathering without the cost of travel and expensive hotel and food costs. In the past attendance was restricted because of travel, room, board, and registration fees, but now costs are reduced to registration fee only. So come on in and join JMM and experience the community and joy of mathematics. Moreover, when the AMS releases registration fees shortly we expect they would be reduced. So [check out the program](#) and plan to attend virtually and soak up great mathematics, both in teaching and research. Registration opens 14 September 2020. Join us! Be there!

SIMIODE will have three related events at JMM 2021, two paper sessions and one minicourse.

- **AMS Special Session** - Adopt, Adapt, Assign Modeling Activities in Differential Equations
- **Contributed Paper Session** - Data-Driven Modeling Projects to Motivate Active Learning & Engagement
- **Minicourse** - Modeling-based Differential Equation

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## **COMING SOON! SIMIODE ONLINE HYPERLINKED TEXT - SIGN UP FOR REVIEW COPY**

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Kurt Bryan, Rose-Hulman Institute of Technology, Terre Haute IN USA, is authoring a hyperlinked text in SIMIODE which will bind 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 Eigenvector: The Linear Algebra behind Google](#). He 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 in modeling as a motivation and teaching approach with links to SIMIODE and other resources. We expect the text to come on line in January 2021 for FREE use in Spring 2021 semester and we will share details as we go. So for now, know there will be a very affordable and solid text - on the order of \$45 US - that will motivate learning differential equations through modeling. The text will include traditional exercises in addition to rich motivating modeling activities from SIMIODE and elsewhere.

**Contact [Director@simiode.org](mailto:Director@simiode.org) if you wish to be kept apprised of progress, offer to review, RECEIVE NOTICE FOR REVIEW COPY, or consider becoming an early user.**

We plan to have a draft available in late Fall 2020. 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 future applications for students while motivating them to see the value and context of differential equations in operation. If you are interested in receiving a draft review version contact [Director@simiode.org](mailto:Director@simiode.org).

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

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SIMIODE will offer a virtual conference, SIMIODE EXPO 2021, International Virtual Conference, 12-13 February 2021, with workshops, contributed paper sessions, panels, and more for faculty AND students. So mark your calendars and watch this space in our next Newsletter for details. This is an opportunity to share your own experiences in using modeling to teach differential equations and to hear of the successes of others. Further, there will be opportunities for small group sessions, one-on-one ZOOM conversations, birds-of-a-feather gathering, and resource exchange. We will also have a track for students on career opportunities with mathematics from industry and academe, coursework and project sharing, and SCUDEM talks. Registration will be very low, \$45 US for faculty 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 offered by [mathdept.org](http://mathdept.org) platform which will permit remarkable interactions and offer all but the smell of coffee and donuts!

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## **SIMIODE REMOTE TEACHING MODULES FOR OFF THE SHELF ONLINE INSTRUCTION**

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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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## NEW MODELING SCENARIOS IN SIMIODE

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- Jeremy Christman, Michael Karls, and Kenneth H. Luther offer an exceptional tour de force with model of groundwater and very nice development of solution by separation of variables technique for solving PDE's in their [9-002-S-GroundWaterFlow](#)."
- Rob Krueger has produced an easy to get hold of and complete from the student perspective on managing a dairy farm operation in his Modeling Scenario [1-119-S-DairyFarming](#),"

These are but a few of the many publications in SIMIODE for you to use with your students. We invite you to search for topics of your interest and include SIMIODE materials in your teaching.

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## SIMIODE SOURCES FOR YOUR OWN MODELING SCENARIOS

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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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## PUBLISH YOUR CLASS EFFORTS IN SIMIODE

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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](mailto: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

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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, 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](mailto:Director@SIMIODE.org).

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