

## Volume VIII Number 2

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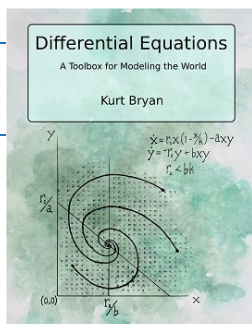
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### SIMIODE ONLINE DIGITAL TEXT

#### ***DIFFERENTIAL EQUATIONS: A TOOLBOX FOR MODELING THE WORLD***

### EARLY SUMMER SALE

**1 MAY - 15 JUNE 2022 SIMIODE OFFERS 20%  
DISCOUNT IN THE PRICE \$39.00 TO \$31.20**



Get your copy now and consider using this exciting approach with your students at the next teaching opportunity. Students purchase your copy for project ideas, challenging and exciting modeling applications, and motivation to study and apply differential equations. Make this part of your summer reads! Enjoy and marvel at the rich applications of differential equations.

SIMIODE offers its digital online textbook, *Differential Equations: A Toolbox for Modeling the World*. The online low cost textbook is available for purchase through SIMIODE.

Hundreds of colleagues have purchased this remarkable text and many are using it to excite their students to the modeling possibilities of differential equations in the classroom.

Authored by the distinguished teacher and writer, Dr. Kurt Bryan, Rose-Hulman Institute of Technology, Terre Haute IN USA, this text takes a modeling first and throughout approach to motivate the study and learning of differential equations in the spirit of SIMIODE, while linking to many SIMIODE Modeling Scenarios and other original activities.

Dr. Glenn Ledder, University of Nebraska, Lincoln NE USA, says in his review in *The UMAP Journal*, "This book is the **only one this reviewer is aware of that presents differential equations in a modeling context** rather than merely adding a bit of modeling to the standard presentation. **If you want to study the mathematics of differential equations in a modeling context, you are in the right place.**"

Here we offer a copy of the [Table of Contents](#) and [Chapter 1](#) to demonstrate our commitment to a modeling first and throughout approach in teaching differential equations.

The text offers some 600 pages of rich modeling motivated materials with support groups in SIMIODE for Students and Teachers with some 400 additional pages of materials (solutions, hints, project ideas, data, computer code, forums, collaborative project space, etc.) to help teacher and student at SIMIODE Textbook - Teacher Group or a SIMIODE Textbook - Student Group.

*Differential Equations: A Toolbox for Modeling the World* puts applications and modeling front and center in an introduction to ordinary differential equations. In taking this approach we do not skimp on or skip over the mathematics, but use applications to motivate both subject and technique. The mathematics presented is interwoven with modeling to drive both the mathematics and understanding of the applications under study and to make the case that differential equations provide a powerful, indispensable toolbox for describing the world.

Again, [purchase this textbook](#), use SIMIODE resources, support SIMIODE, enjoy the read, and

adopt the text for your course on behalf of your students.

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## **SIMIODE CONTRIBUTED PAPER SESSION AT MATHFEST, 3-6 AUGUST 2022**

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SIMIODE will host a Contributed Paper Session, *Share the Joy in Teaching Differential Equations Through Modeling*, at **MathFest 2022**, Philadelphia, 3-6 August 2022. This will be a full in-person meeting, with a robust virtual component for remote attendance. So plan to submit an abstract when the process opens soon and then attend. [Submit an abstract](#) by 30 April 2022. Have a title and abstract ready. The deadline for submission of abstracts is 30 April 2022. We look forward to hearing about what you are doing in your classroom. So think about sharing your experiences and the joy in using modeling to motivate and teach differential equations in context, both as an introduction to the mathematics and as a narrative of a complete modeling cycle from experiencing a real-world phenomenon, through data collection, to model building with parameter estimation, and finally model validation.

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## **MAA OPEN MATH WORKSHOP - 5-8 JULY 2022**

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The Mathematical Association of America (MAA) and the University of Colorado Boulder (CU-B) are implementing a new online teaching- and learning-focused professional development program which will reach higher education professionals, including those who have been less able to travel due to various constraints. SIMIODE is proud to be a part of this effort with an intensive workshop, *Modeling Inspiration for Differential Equations*, (5 - 8 July 2022 intensive, online 5 hours/day) for teachers who wish to do modeling in their differential equations course. A team of colleagues will engage participants in modeling activities so they experience the activity as students and then support them as they teach units to workshop colleagues to feel the joy of using modeling in teaching. Limited to 25 attendees. Look for details at [MAA.org](#).

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## **PRISON MATHEMATICS PROJECT**

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At the [SIMIODE EXPO 2022 Conference](#) there was an exceptional [Keynote talk](#) followed by an informal Breakout discussion, given by Amit Sahai, Computer Science, University of California, Los Angeles CA USA; Christopher Havens, Executive Director and Founder, Prison Mathematics Project, TRU at Monroe Correctional Complex, Monroe WA USA; Ruth Utnage, Executive Assistant, Prison Mathematics Project, Seattle WA USA; Trubee Davison, Mathematics, Western Colorado University, Gunnison CO USA; and Timothy Pennings, Davenport University, Grand Rapids MI USA, about the Prison Mathematics Project. The Prison Mathematics Project (PMP) works towards a new understanding of the role of mathematics in self-identity and desistance among a demographic of prisoners who are actively exploring a higher education. The aim is to achieve positive changes in self-identity and desistance by providing knowledge, instilling a sense of community and culture, and establishing network connections to promote self-rehabilitation among participants through engagement of mathematics. Such engagement is nurtured through active mentorship by members of the mathematical community. See the current issue of the [Prison Math Newsletter](#) 3.

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## **GRADUATE STUDENT MATHEMATICAL MODELING CAMP**

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The Seventeenth Annual Graduate Student Mathematical Modeling Camp will be held 8-11 June 2022 at the University of Delaware.

The [GSMM Camp](#) is a weeklong workshop directed towards interdisciplinary problem solving whose aim is graduate student education and career development. The GSMM Camp is designed to promote a broad range of problem-solving skills, including mathematical modeling and analysis, scientific computation, and critical assessment of solutions. All students accepted to the program will be reimbursed for reasonable travel and local expenses.

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## **NOTICES OF THE AMERICAN MATHEMATICAL SOCIETY**

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The [Notices of the American Mathematical Society](#) is the place to go for mathematics news, expository articles, and practical pieces for colleagues at all stages of their careers. The Early Career section offers a community project since 2019, in which thematic-compilations of articles inform graduate students, job seekers, early career academics, and mentors. Often, the pieces have great advice and raise awareness of issues that could advance careers.

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## **PROGRAM AND COMPLETE VIDEOS FROM SIMIODE EXPO 2022, 10-13 FEBRUARY 2022**

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With the successful completion of SIMIODE EXPO 2022, an international and online conference, 10-13 February 2022, we post the [slides and videos](#) of the very stimulating talks and sessions. While focusing on differential equations the conference featured keynotes and talks in areas such as cryptology, dietary modeling, communication, modeling, data, and much more. Learn about wind-up truck mathematics, high school student perspectives on modeling, Prison Math Project, dietary modeling, running a summer math camp, and so much more. Catch the action from the conference and plan to attend SIMIODE EXPO 2023 next February 2023.

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

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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

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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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## APPLY FOR THE 2022 BIOME INSTITUTE

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Summer session: July 18 - 29, 2022 (first week synchronous, second week asynchronous) and Fall working groups: September 5 - November 18, 2022

BioQUEST is thrilled to announce the [2022 BIOME Institute](#), a fantastic virtual professional development opportunity for STEM educators to engage with a community of peers to address an educational challenge--with the goal of improving student outcomes. This year's theme is "Sparking IDEAS: Inclusive, Diverse, Equitable, and Accessible Communities in STEM Classrooms."

The BIOME is a special opportunity to join a fantastic community of educators committed to STEM education reform. [Find more details here](#), and we hope to see you. Early bird deadline is April 17, with a final deadline of May 10.

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## OTHERWISE MATERIAL

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Lucy S. Oremland, Justin R. Dunmyre, and Nicholas Fortune have published a very [relevant paper](#), "Reinventing the Salty Tank Through Guided Inquiry," in *PRIMUS*, 32(5)(2022): 621-635.

In this paper, we discuss mathematical modeling opportunities that can be included in an introductory Differential Equations course. In particular, we focus on the development of and extensions to the single salty tank model. Typically, salty tank models are included in course materials with matter-of-fact explanations. These explanations miss the opportunity for students to develop rate of change equations for themselves. In this paper, we highlight an open-ended single salty tank task that provides the foundation for more complicated salty tank models that we also detail herein. Furthermore, we discuss instructional implementation techniques that instructors can use in their classes to meet their specific learning goals.

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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.

**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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