

Volume II Number 5

PLEASE SUPPORT SIMIODE WITH TAX DEDUCTIBLE CONTRIBUTION

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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

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GRATEFUL THANKS FOR CONTRIBUTING BOARD OF ADVISORS

Since SIMIODE's inception we have had the benefit of the advice, support, time, ideas, contributions, and energy of a Contributing Board of Advisors. We have benefitted immensely from their efforts on behalf of SIMIODE and we truly thank them. We list their names with our grateful thanks.

Chris Arney, Karen Bliss, Applied Mathematics, Virginia Military Institute, Lexington, Matt Boelkins, Kurt Bryan, Duff Campbell, Rachelle DeCoste, Lisa Driskell, Barbara Edwards, Rosemary Farley, Jeff Froyd, Keith Howard, Mike Huber, Dick Jardine, Michael A. Karls, Zachary Kudlak, Rich Laverty, Jessica M. Libertini, Audrey Malagon, Chris McCarthy, Sheila Miller, Joe Myers, Leigh Noble, Elisha Peterson, Therese Shelton, Allan Struthers, Patrice Tiffany, Mark Tourtellott, A. David Trubatch, Marie Vanisko, Gregg Waterman, Stephen Wilkerson, Brian Winkel, and Dina Yagodich.

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SPECIAL REFEREE APPRECIATION

The material, which is published in SIMIODE, benefits from a double-blind, peer-reviewed referee system. Thus we appreciate all those who volunteer their time and energy to referee materials for publication online in SIMIODE. We list their names with our appreciation.

Jeff Alden, Chris Arney, Soumya Banerjee, Gabriele Barbaraci, Andrew Bigelow, Karen Bliss, Nancy Boynton, Neal Brand, Duff Campbell, Elizabeth Carlson, Kelly Cline, Bruce Conrad, Rachelle DeCoste, Lisa Driskell, Keith Erickson, Janet Fierson, Hilary Fletcher, Edward Fuselier, Reinaldo Garcia, Michelle Ghrist, Rakesh Gollen, David Goulet, Constant Goutziers, William Green, Michel Helfgott, Keith Howard, Nicholas Howard, Mike Huber, Vin Isaia, John Jackson, Dick Jardine, Mike Johnson, Michael Karls, Richard Ketersid, Jeff Knisely, Paul Laumakis, Richard Laverty, Jessica Libertini, Gesham Magombedze, Audrey Malagon, Victor Martinez-Luaces, Chris McCarthy, Nathaniel Miller, Sheila Miller, Mike Moloney, Jeet Mozumdar, Rajib Mukherjee, Joe Myers, Keith Nabb, Leigh Noble, Melvin Nymman, Jonathan Paynter, Jennifer Pazour, Mark Peletier, Timothy Pennings, Dale Peterson, Elisha Peterson, Peter Plostins, Kirill Poletkin, Alexander Prokopenya, Terrance Quinn, Masoud Rahiminezhad Galankashi, Jim Rolf, Yosi Shiberu, John Sieben, Amritasu Sinha, Gregory Sluszzyk, Stefano Spezia, Greg Spradlin, Allan Struthers, Eric Sullivan, Edward Swim, John Thoo, Carl Toews, Marie Vanisko, Gary Washington, Krista Watts, Everett Williams, Dina Yagodich, and Lun Yang.

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SIMIODE IS NOW A TAX EXEMPT ORGANIZATION

SIMIODE is now a 501(c)(3) tax exempt organization and can accept tax deductible contributions from individuals, corporations, and foundations. Previous to this SIMIODE was privately funded with some much appreciated assistance from COMAP (Consortium for Mathematics and its Applications).

As a mathematics education organization we are open to receiving public support. In fact, we will need this support to exist. You can contribute financial support for SIMIODE for 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](#) . Thank you.

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CHECK OUT OUR SIMIODE BLOG

In our [SIMIODE Blog](#) we offer thoughtful commentary on broad issues related to modeling, differential equations, students, our profession, and more.

We encourage comments on entries and further conversation on the issues presented. Check us out at [SIMIODE Blog](#).

Here are three (among many more) entries which might interest you.

[Checking out what is on the other side of the fence](#)

[Mathematics grips the world through differential equations](#)

[Wave of the future and it is good for mathematics](#)

These and more await your read and your comment.

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WHAT ARE YOU WAITING FOR? PUBLISH IN SIMIODE.

If you are reading this then you probably are teaching differential equations of some sort. Moreover, you have probably written and assigned projects. Well, now is the time to publish your materials online in our peer reviewed, double blind referee system.

We quote Willie Nelson in our blog entry of 14 May 2016 [The Wisdom of Willie Nelson](#). He said, "If you can be content right now, then you'll always be content, because it's always right now." Do not just be content that you have done great things for your students. Share that good news and experience with others through publication in SIMIODE.

You can see how to submit your materials [here](#). What you do is important to your students, but it is also important for your colleagues and their students. Step up and write up your projects for SIMIODE. You will have an online publication at SIMIODE. You will be pleased to know others are using your ideas, building on your success, and enjoying what you enjoy with your students. So, what are you waiting for? Just do it!

Your contribution can be a modest modification of a text problem as we offered in [1-93-S-SucroseReaction](#) or as broad in scope as [4-20-S-AnIEDBlast](#).

One of the main purposes 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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MODELING SCENARIOS YOU MIGHT CONSIDER USING IN YOUR TEACHING

We publish more and more Modeling Scenarios all the time after they have worked their way through the referee and editorial process and are now available. Here are a few which might interest you.

Keith Landry, Civil Engineering and Construction Management, Georgia Southern University, and the SIMIODE Director, Brian Winkel, offer a view into the world of Tuned Mass Dampers ([Part I](#) and [Part II](#)). TMDs keep structures from excessive displacements when struck by earthquakes, tremors, or high winds. This study offers students a chance to see differential equations in action to make inaction!

Dan Flath of Macalster College in St. Paul MN offers a stochastic modeling opportunity in [1-39-S-StochasticPopModels](#). This is one of several modeling scenarios in SIMIODE which addresses the underlying stochastic nature of many phenomena which differential equations address at a surface level.

Lisa Driskell of Colorado Mesa University, Grand Junction CO offers a very nice and concise modeling opportunity in [1-38-S-Ebola](#). This is modeling supported by real data from the World Health Organization in which students need to build and compare several models.

Hope McIlwain of Mercer University in Macon GA introduces us to the world of rating chess players in her modeling scenario [1-95-S-RatingChessPlayers](#). This is modeling using Elo's Method for rating chess players and is accompanied by simulations.

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REGISTERING IN SIMIODE

If you have not registered in SIMIODE please go to our [Home Page](#) and do so to benefit from the rich resources in the SIMIODE community.

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[LOOKING AHEAD TO SIMIODE MINICOURSE AT JMM 2017 IN ATLANTA](#)

The title of the minicourse is, "Teaching Modeling-First Differential Equations - Technology and Complete End Game Efforts." The team leading this effort will be Rosemary Farley, Manhattan College; Therese Shelton, Southwestern College; Patrice Tiffany, Manhattan College; Jon Paynter, US Military Academy; and Brian Winkel, SIMIODE.

We will offer experiences for building and teaching mathematical models with differential equations: epidemic model of school infirmity, Torricelli's Law, fishery management effort, post-operative retinal fluid dissipation, fair stadium design, sublimation of carbon dioxide, chemical kinetics, ant tunnel building, spread of oil slick, pursuit efforts, pharmacokinetics of LSD and paracetamol, shuttlecock fall, and lake algae. We will discuss the role technology plays in the end game modeling efforts of parameter estimation, non-linear regression analysis, and model comparison. Through hands-on small group learning, faculty will experience the use of modeling and technology to teach differential equations. We, of course, plan to use SIMIODE - Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations, an online (www.simiode.org) community of teachers.

Look for more details in Fall 2016 in MAA literature and website.

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FREE ONLINE DIFFERENTIAL EQUATIONS TEXTS

We offer annotated listings of FREE online differential equations 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. At least look at what is available.

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SIMIODE CHANNEL AT YOUTUBE

SIMIODE has a channel at YouTube [SIMIODE YouTube Channel](#). In addition to an introductory overview, a video of what SIMIODE is and can be, there are several videos related to Torricelli's law in which students can collect their own data from a real physical event, model the phenomenon, estimate parameters, and confirm their analysis with comparisons of plots of final model and data. One video is for a right circular column of water in which the water is draining from the cylinder while a digital clock offers time to the thousandth of a second in the background and the height can be seen to the nearest millimeter. Here is an example at [Falling Column of Water in Cylinder](#). Another is of right circular cone of water in which the water is draining from the cone while a digital clock offers time to the thousandth of a second in the background and the height can be seen to the nearest millimeter.

We just recently posted an [animation of condensation](#) in which viewers can collect data from a simulation video of particles moving about a boxed region and condensing on one side of the box. This is used in a modeling activity to confirm the model and to estimate parameters of the model.

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STREAMING OF VIDEOS IN SIMIODE

In the current version of the HUBZero platform for SIMIODE we can now stream all videos offered by colleagues who post them. This means individuals who cannot gain access to YouTube can get access to our videos directly at www.simiode.org. Moreover, now videos will be positioned at the appropriate place in support of the material offered. Here is an example [Cannister Falling in Water](#) associated with the modeling scenario 3-70-S-FallingInWater. These videos have been effective substitutes for real lab data acquisitions, indeed, they are videos of real lab data acquisitions. We will continue to also post videos on our [SIMIODE YouTube Channel](#).

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SOURCES FOR YOUR OWN MODELING SCENARIOS

SIMIODE offers [potential modeling scenario ideas](#). These are materials, thoughts, pointers, summaries, articles, etc. to encourage and support your modeling scenario ideas. Consider these ideas and use them to design your own modeling scenarios for your students and then publish this material in SIMIODE. You must be registered and signed in to view these resources.

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WORDS OF ENCOURAGEMENT 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 do this at [Resources: New](#). 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 locally or beyond 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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