

BioGears Conference 2020

B Breaks and Networking **K** Keynote and Conference Highlights **S** Session Talk

MARCH 17 • TUESDAY

8:30am – 9:15am **B Breakfast: Networking** Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910)
Light breakfast provided. Please get to the conference prior to the keynote to get signed in.

9:15am – 10:00am **K Keynote Speaker** Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910)
Speakers: Prof. Geoff Miller
Geoffrey Miller is an Associate Professor, School of Health Sciences, and Simulation Researcher at the Sentara Center for Simulation and Immersive Learning at Eastern Virginia Medical School (EVMS) in Norfolk Virginia. Geoff joined EVMS in January of 2011, overseeing the expansion of simulation-based educational activities, curriculum development and educational outcomes and translational analysis, with an emphasis on the creation and improvement of operational and clinical competence assessment using advanced educational technology, modeling, simulation and visualization systems, specializing in immersive virtual environments, augmented reality for remote medical care, serious gaming and innovative educational technology development. Geoff was appointed as a Senior Research Scientist (2015) at the Medical Modeling and Simulation Innovation Center at the Telemedicine and Advanced Technology Research Center (TATRC), U. S. Army Medical research and Materiel Command (USAMRMC). In this role, Geoff oversees and conducts research and technology development into future generation medical modeling, simulation and visualization efforts focused on Military Health System needs. Recently, Geoff has worked on the invention and development of an innovative, automated and immersive simulation technology, which was recognized by the National Academies of Sciences, Institute of Medicine as the Lead Innovation at the Global Forum on Innovation in Health Professional Education. Previously, Geoff was the Associate Director of Research and Curriculum Development for the Division of Prehospital and Emergency Healthcare (2000-2011) at the Michael S. Gordon Center for Research in Medical Education (GCRME), University of Miami Miller School of Medicine. Geoff is actively engaged in scholarly research and publication in simulation and healthcare education. He has coauthored several books and has authored and co-authored numerous publications. He is a frequent invited speaker at state and national and international conferences.

10:00am – 10:30am **S BioGears: Past, Present, Future**
Speakers: Austin Baird, PhD Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910)
Austin Baird, PhD, the BioGears Principal Investigator will give a talk focusing on the current functionality of BioGears and upcoming technical work that will impact the user community.

10:30am – 10:45am **B Coffee Break** Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910)

10:45am – 11:15am **S Unique BioGears Models** Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910)
Speakers: Matt McDaniel
Our lead physiology modeler, Mr. Matt McDaniel will provide an in depth talk about models that are unique to BioGears. This discussion will include high level overview of major advancements of BioGears over 2018-19 and associated results of interest. Models covered will include: sepsis/inflammation, micro-circulation, and TBI.

This talk will be followed by an in-depth Q&A session to further discussion for interested parties.

11:15am – 11:45am **S BioGears Applications: Artificial Intelligence and Machine Learning**
Speakers: Adam Adamos- Binks, PhD, Christie S. Burris Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910)
This talk will detail how to use BioGears as a tool to create simulated Electronic Health Record data. Problems and possible future directions will be discussed.

Abstract:

Reliable machine learning (ML) algorithms require a training dataset free from noise and mislabeling. Electronic Health Records (EHR), the largest source of time series data on patient healthcare, often suffer from these common pitfalls, limiting their utility in ML development. The 4TDS project is partnering with BioGears to build an ML algorithm that predicts the onset of septic shock from a patient's vital signs. By supplementing existing EHR datasets with BioGears patient simulations we are addressing important data quality issues and opening up the scope of AI in healthcare.

11:45am – 12:15pm	S BioGears Team Panel Discussion & Q&A <i>Speakers: Austin Baird, Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910) PhD, Matt McDaniel, Nathan Tatum, Steven A. White, PhD, Lucas Marin</i> This session will provide the entire leadership and development team of the BioGears engine to the community to answer detailed questions. Feel free to bring any questions you may have!	
12:15pm – 1:00pm	B Lunch	Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910)
1:00pm – 1:30pm	S BioGears Modeling: Drug Model Overview <i>Speakers: Austin Baird, PhD</i> Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910) Overview of the BioGears drug modeling framework. Its history, application and a discussion of available drugs. A high level overview of a drug administration scenario construction and implementation will be detailed.	
1:30pm – 2:00pm	S BioGears Drug Modeling: Oral Transmucosal Fentanyl and GI Absorption <i>Speakers: Matt McDaniel</i> This talk will provide specific modeling details regarding extensions we have made to our drug framework in the past year. Oral transmucosal administration and associated GI absorption will be detailed for the example of Fentanyl. Validation results and a discussion on the construction of the model will be covered.	
2:00pm – 2:15pm	B Coffee Break	Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910)
2:15pm – 3:00pm	S BioGears Applications: User Interface Substance Administration <i>Speakers: Matt McDaniel, Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910) Steven A. White, PhD</i> Come learn about the new BioGears user interface and how to add a substance/drug to BioGears using the new UI! This demo focused presentation will detail administration options, creating a substance file, and creating and launching a validation scenario.	
3:00pm – 3:30pm	S BioGears: Integrator highlights <i>Speakers: Austin Baird, PhD</i> This talk will focus on the user community. Advances that have been made thanks to collaborative efforts, validation work, and third party collaborators we are currently working with.	
3:30pm – 4:00pm	S BioGears 8.0 Roadmap Silver Spring Civic Center (Silver Spring Civic Building, 1 Veterans Pl, Silver Spring, MD, 20910) <i>Speakers: Steven A. White, PhD</i> 30 Minute Presentation on the goal of BioGears 8.0 and the general API direction. Talk will be informal and allow community involvement as it is designed to get feedback on integrators needs.	