



Emergent Mechanisms in Biology of
Robustness, Integration & Organization

Emergence: A biweekly newsletter of discovery, education, and outreach from the EMBRIO Institute

Issue 8: November 16, 2022

DIRECTORS' NOTE

This past Friday was Veterans Day. Thank you to all veterans in the EMBRIO community for your service. Prior to the Thanksgiving break this next Monday, Nov. 21, will feature the Taeyoon Kim Lab, with Jeffrey Coulter presenting his project on extending computational models to account for coupled, chemical-mechanical interactions related to calcium and actin. Read more about Jeffrey in this issue in the Member Spotlight section.

Following Thanksgiving break, on Nov. 28th, we invite all students and postdocs to join for continuation of the *Grants Professional Development* series. During this next session, a panel of EMBRIO faculty will field questions and talk about their experiences with different funding agencies, understanding the parts of a grant, proposal writing and grant getting in general. More details on the training series are in this issue.

A heads-up that for Spring semester 2023, we will maintain our Monday 3pm (ET) time continuing Weekly Updates with research talks, DEI topics, and professional development trainings. Stay tuned for the January schedule.

Attention to mental health and resilience is critical for our individual and shared success. Those mentoring trainees can gain knowledge from checking out the free series NIH is offering to promote mental health and well-being of the academic research community titled [RAISING A RESILIENT SCIENTIST](#). The next training in the series will be December 14 on "Promoting Trainee Resilience".

EMBRIO members are encouraged to check out the one-day virtual Notre Dame - Mexico Symposium 2022 co-organized by Jeremy Zartman, "Reverse Engineering Cellular Systems: Patterning and Morphogenesis" happening on December 9, 2022. [Registration and call for abstracts](#) open now.

We want to hear about your news and announcements. Send them to Brent (laddb@purdue.edu) by 11/25 for inclusion in the next issue of *Emergence*.

David, Chris, Stephanie, and Brent

Quotable Quote:

“What is wanted is not the will to believe, but the will to find out, which is the exact opposite.”

Bertrand Russell

QUICK LINKS

[Schedule Your One-on-One Interview with Soumi](#)

[Reverse Engineering Cellular Systems Workshop](#)

Propose Breakout Room Topics during Weekly Updates (Email Brent: Laddb@purdue.edu)

[RAISING A RESILIENT SCIENTIST NIH series](#)

EMBRIO TRAINEE PROFESSIONAL DEVELOPMENT *GRANTS SERIES*

Calling all Trainees and Postdoctoral Fellows of EMBRIO. We will continue the professional development Grants series, with the next session during our Weekly Update time 3pm ET on Monday, November 28th. Dates for spring semester will be shared in the next newsletter.

November 28th : The Grants Process and Federal Granting Agencies – Faculty Panel

January TBD : De-Mystifying the Craft of Creating an Aims Page

February TBD: Students present draft Aims page for Peer-Feedback (Jazzmin Owens and Peter Brumm)

EMBRIO RELATED 1-Day WORKSHOP: *Reverse Engineering Cellular Systems: Patterning and Morphogenesis*

Virtual Notre Dame - Mexico Symposium 2022: **Reverse Engineering Cellular Systems: Patterning and Morphogenesis**

December 9, 2022

Co-organized by EMBRIO faculty Jeremy Zartman at Notre Dame, this is a virtual 1-day symposium of potential interest to members of the EMBRIO community. Registration and call for abstracts: <https://forms.gle/KZurTw5rwxycdYxE9>

Registration is free and abstracts are being accepted for short talks on topics related to patterning and morphogenesis. The symposium highlights several researchers from across Mexico and includes a talk from Bomyi Lim, who works on gene regulation at our partner U Penn.

MEMBER SPOTLIGHT: JEFFREY COULTER



Jeffrey Coulter is a Ph.D. student in the Taeyoon Kim Lab, Weldon School of Biomedical Engineering, Purdue University.

What's your hometown, State, Country (and one thing you love, miss, remember, or want to tell others about it)?

I spent the first half of my life in Dallas, Texas and the second half in Warsaw, Indiana. Warsaw is small, so there's not much going on. There are a lot of lakes nearby, though, so I spent a lot of time on the water in high school.

What are your hobbies?

I enjoy running and seeing plays at the theatre. I probably spend most of my free time reading or writing code (I suppose I'm in the right place, since this is what I do all day for my research).

What drew you into becoming a scientist or engineer (or both)?

I entered college as an English major. At some point, I decided to read a book about wind turbines, which sparked an interest in fluid dynamics, so I started to study math and physics. My interest in fluid dynamics extended over time to include soft and active matter physics, which is what brought me to biology.

Tell us the main point of your research as it relates to EMBRIO:

I am in Thrust 1, working with Dr. Taeyoon Kim. His research is related to developing coarse-grained, computational models to understand the mechanical properties of the actin cytoskeleton, and I'm working on extending these models to account for coupled, chemical-mechanical interactions related to calcium and actin.

You find yourself alone on an elevator with the president of your university – who knows very little about your field: They ask you to tell them about your research (15 seconds - go!):

We are trying to understand how chemical and mechanical components of the cell interact with each other by developing computational models. These models will allow us to find quantitative relationships between biochemical events and cell structure.

What's on the horizon for you (research, career, personal, whatever you want to share)?

This is my first semester, so I have a few more years here at Purdue. Next semester I'm going to the APS conference in Las Vegas, so that should be fun. I've never been there.

What's your various URL/social media handles that others can follow (prof. website, twitter, LinkedIn, blog, etc)?

www.linkedin.com/in/jeffery-coulter

Weekly Update Zoom Breakout Rooms:

Are you looking for a collaborator? Would you like to get conversation started about a specific research topic with other EMBRIO members? Email me (Brent, laddb@purdue.edu) with your breakout room topics for upcoming Weekly Update sessions.

INSTITUTE EVALUATION: SIGN UP FOR YOUR ONE-ON-ONE INTERVIEW (hint: it's mandatory)

“My name is Soumi Mukherjee, and I am a Graduate Student at the Department of Biological Sciences at Purdue. Along with my advisor Dr. Stephanie Gardner, I will be conducting an institute wide evaluation study as a part of Thrust 4 initiative. The process will help in capturing your experiences as a member of EMBRIO, which will be utilized to create a formative evaluation report for NSF at the end of each year. Your participation will not only aid in furthering the goals of the institute for providing an interdisciplinary collaborative environment essential for promoting knowledge integration across all the four thrusts, but also enable us to structure activities catered towards your own professional development.

If you are a member of the EMBRIO institute currently doing a research project, we would like to invite you for participating in this study. Participation in the evaluation process is MANDATORY for all the members of the institute.

As a part of the evaluation process, you will take part in an online session (via Zoom), which includes an interview and a brief survey, and the entire process should be completed in less than an hour. Interviews will be conducted annually for the total duration of your participation in the institute and the session would not exceed an hour and would be completed in a day.

Please fill in all the times you may be available for our interviews using the link below with either your name or email address. This information is requested so that we may contact you to set up an online session, but we will use a randomly generated 4-digit code in place of your name to identify all your information for the data collection and analysis.

<https://www.when2meet.com/?16968903-R8veS>

Your participation will not affect any aspect of your association with the EMBRIO institute. If you have any doubts regarding the evaluation process, please reach out to me at mukher42@purdue.edu.”

With Regards
Soumi

NIH Raising a Resilient Scientist Series

The NIH OITE is pleased to offer the [RAISING A RESILIENT SCIENTIST](#) series for faculty, staff scientists, and administrators who mentor students and postdoctoral fellows in the biomedical, behavioral, and social sciences. The goal of the Raising a Resilient Scientist series is to promote the mental health and well-being of the academic research community by supporting faculty and administrators to develop self-management, relationship-management, and mentoring skills.

Raising a Resilient Scientists Units	Workshop Date	Registration
Communication Skills to Build Trainee Resilience	Nov 9, 2022 12:00–2:15 pm ET	https://nih.zoomgov.com/meeting/register/vJlsdevhrjwsG3qSI89jFIF9zUdzoYIz4Vw
Promoting Trainee Resilience	Dec 14, 2022 12:00–2:15 pm ET	https://nih.zoomgov.com/meeting/register/vJlsc-uvpzovGbw2kGLBSbihRcERfN2raTc
Building a Welcoming and Inclusive Research Group	Jan 11, 2023 12:00–2:15 pm ET	https://nih.zoomgov.com/meeting/register/vJlscOurqjojGtH9Y_zDJPVHhg2Nm6zWNB0
Difficult Conversations, Conflict, and Feedback	Feb 8, 2023 12:00–2:15 pm ET	https://nih.zoomgov.com/meeting/register/vJlsc-CgrTsiHfcOa91MnLLO- REQmdOO2I
The Mental Health and Well-being of Your Trainees	Mar 8, 2023 12:00–2:15 pm ET	https://nih.zoomgov.com/meeting/register/vJlscuCpqT4pEzjHEmDI2E604ncYzhOrhm4

There is no charge for participation, but advanced registration is required. For more information, and to register, please visit their [webpage](#). Participation in the entire series is recommended but is not required. Please do not hesitate to email Dr. Milgram if you have any questions.

Dr. Sharon L. Milgram
(she/her/hers)
Director, NIH Office of Intramural Training & Education
NIH Office of the Director
www.training.nih.gov

UPCOMING DEADLINES, IMPORTANT DATES, & INFO

Weekly Research & Education Zoom Meetings Fall Semester, Monday's 3 – 4 pm.

Zoom link:

<https://purdue-edu.zoom.us/j/96053485465?pwd=eVnY2owcm9kaFRtVUdPcmFHAGl1UT09&from=addon>

- November 21 – Jeffrey Coulter (Taeyoon Kim Lab), Breakout Topics
- November 28 – EMBRIO Grants Student Professional Development session 2
- December 5 – Gregory Reeves, Assoc. Prof., Chem. Eng., TAMU
- December 12 – Data Platform Session, Lev Gorenstein, Rosen Center for Advanced Computing
- Winter Break

Nov. 9, 2022 – March 8, 2023. NIH [RAISING A RESILIENT SCIENTIST](#) series.

Dec. 9 Virtual Notre Dame - Mexico Symposium 2022: **Reverse Engineering Cellular Systems: Patterning and Morphogenesis**. Registration and call for abstracts: <https://forms.gle/KZurTw5rwxYCdYxE9>

Jan. 2 – 6, 2023: The BMES Cellular and Molecular Bioengineering Special Interest Group is seeking abstracts for the [BMES Conference \(CMBE\)](#) in Indian Wells, CA.

Hot Off the Press: New EMBRIO Journal and Conference Papers

Let us know about new papers you want to highlight for the EMBRIO community!

REMINDER: EMBRIO Acknowledgement for Scholarly Papers.

For EMBRIO related research publications, NSF requires acknowledgement of EMBRIO NSF funding for our Institute to claim the work in our reporting back to NSF. Please include the following acknowledgement in your journal and conference papers and posters: **“This work is based upon efforts supported by EMBRIO Institute, contract #2120200, a National Science Foundation (NSF) Biology Integration Institute.”**

Conference Presentations:

Author: Norma Citlalcue Pérez Rosas & Ursula Kummer

Title: Regulation of Calcium Homeostasis in the Trans-Golgi Network of HeLa Cells
Meeting: ISCB-LA SoIBio BioNetMX 2022, Juriquilla, Queretaro, Mexico
Dates: Nov 3-7
Link: <https://www.iscb.org/la2022-schedule/programme>

Norma Citlalcue Pérez Rosas, organizer
Workshop Title: Introduction to Reproducible Systems Computational Modeling Workflows Enabled by COMBINE Standards
Meeting: ISCB-LA SoIBio BioNetMX 2022, Juriquilla, Queretaro, Mexico
Dates: Nov 3-7
Link: <https://www.iscb.org/la2022-schedule/workshops-tutorials>

Author: Norma Citlalcue Pérez Rosas
Title: Modelos multiescala para el análisis de sistemas biológicos
Meeting: Congreso Internacional de Ingenierías 2022, Misantla, Veracruz, Mexico
Dates: Nov 17-19
Link: <https://tecmisantla.tech/cii2022/>

Awards

Let us know about awards that you want to highlight.

Open Positions

Postdoctoral Fellow Position in Interdisciplinary Biomedical Research and Data Science, Purdue University

A full-time postdoctoral fellow position is available immediately for interdisciplinary research in computational systems biology and collaborative data science at Purdue University. The postdoctoral position is associated with EMBRIO (Emergent Mechanisms in Biology of Robustness, Integration, and Organization), an NSF Biology Integration Institute with six university partners. The postdoctoral fellow will be broadly involved in the EMBRIO Institute, with efforts engaged in computational systems modeling and simulation research, as well as building expertise, guidance, and collaboration support and research in data management and data analysis for EMBRIO teams. The postdoctoral fellow will conduct research under the guidance of Dr. Elsje Pienaar (<https://engineering.purdue.edu/PienaarLab>) and be co-advised by Dr. Adrian Buganza Tepole (<https://engineering.purdue.edu/tepolelab/>).

As part of the work with the Pienaar lab the fellow would build and calibrate computational models of Calcium signaling in multicellular environments and its diverse downstream effects. Together with the Tepole lab the fellow would work to leverage machine learning (ML) tools to speed up and automate model evaluation, and to complement closed-form models with multi-modality ML metamodels for improved accuracy. The work is highly interdisciplinary and highly integrative across multiple systems. The fellow will work closely with experimental experts in zebrafish, plant and tissue culture biology within the EMBRIO Institute to build and parameterize the models. The fellow will also have opportunities to work closely with other computational faculty, staff and students on innovating new ways to integrate and analyze models and data across biological scales and systems.

As these specific projects progress, the postdoctoral fellow will have the opportunity to collaborate with investigators and interdisciplinary teams to research and deliver secure systems of data collection, storage, sharing, and analysis to produce new and actionable knowledge. This work will research and provide regular guidance and training in data science best practices and serve as a point of contact for all things data related. The postdoctoral fellow will have the opportunity to co-write proposals and to develop research components around the data-rich interdisciplinary modeling and simulation environment of EMBRIO.

A Ph.D. degree in Data Science, Computer Science, Biomedical Engineering, Chemical Engineering, Mechanical Engineering, Mathematics, Physics or related fields is required. Previous experience in computational modeling, systems biology, stochastic modeling, numerical methods, and associated statistical analysis, data science, or research data management is desired. Successful applicants will be detail oriented, eager to learn new methods, and enthusiastic about computationally rigorous modeling, collaborating across disciplines, working with experimental biologists and chemists, and advancing and supporting the research data realm of EMBRIO Institute. Salary to be negotiated.

To apply for this position, please submit to Dr. Pienaar (epienaar@purdue.edu) and Dr. Buganza Tepole (abuganza@purdue.edu): (1) your CV, (2) a cover letter explaining your background, interest and qualifications for the position, and (3) contact information for three references, including your relationship to the reference, their phone number, email address, and mailing address. Please contact Dr. Pienaar (epienaar@purdue.edu) for formal inquiries.

Postdoctoral Fellow Position in Interdisciplinary Biochemical Cancer Research, University of Notre Dame

A full-time postdoctoral fellow position is available immediately for Multidisciplinary Cancer Research at the University of Notre Dame, affiliated with the Harper Cancer Research Institute, the Notre Dame Warren Drug Delivery Center and Notre Dame Institute for Precision Health. The perspective candidate will conduct an interdisciplinary research on projects studying the basic molecular mechanisms of multiple birth defects, cancer progression and neurodegeneration and developing novel therapies to combat them. The postdoctoral fellow will receive crossdisciplinary training in biochemistry, cell biology, synthetic organic chemistry, and drug discovery utilizing a broad range of biochemical assays related to phenotypic screening and protein-protein interactions. The postdoctoral fellow will conduct research under the guidance of a mentoring team, including Dr. Jeremiah Zartman (<http://sites.nd.edu/zartmanlab/>) and Dr. Brandon Ashfeld (<https://ashfeldlab.nd.edu/>).

A Ph.D. or M.D. degree in cell or molecular biology, genetics, biochemistry, chemistry or a related discipline, is required. Previous experience in genetics, screening technologies and associated statistical analysis, synthetic chemistry, imaging or mouse modeling is desired. Successful applicants will be detail oriented, eager to learn new techniques, and enthusiastic about biology, exploring the interface between chemistry and biology, and working in an academic lab environment. Salary is commensurate with experience.

To apply this position, please submit: (1) your CV, (2) a cover letter explaining your background, interest and qualifications for the position, and (3) contact information for three references, including your relationship to the reference, their phone number, email address, and mailing

address. Please contact Dr. Jeremiah Zartman (jzartman@nd.edu) or Dr. Brandon Ashfeld (bashfeld@nd.edu) for formal inquiries.

New Lab Members?

Did you recently have new students or staff members join your EMBRIO projects? We want to add them to the listserv, Box account, demographics survey, and Personnel List for ensuring their inclusion in communications and participation. If they are not already on our Personnel spreadsheet (<https://app.box.com/s/frd9275xc069gmtbe3y1osoz1j7ssk7>), or they have graduated, let Brent know their names and email contacts (laddb@purdue.edu)

Submit your items for the next newsletter by Nov. 25 to Brent (laddb@purdue.edu)