



Emergent Mechanisms in Biology of
Robustness, Integration & Organization

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

Issue 9: November 30, 2022

DIRECTORS' NOTE

As we bid farewell to November, we hope everyone had an enjoyable break last week and will have a positive wrap up to the Fall semester in the coming weeks.

For our Weekly Update next Monday, December 5th, we feature guest speaker and our first affiliate member, [Dr. Gregory Reeves](#), Chemical Engineering, Texas A&M University. The following Monday, on Dec. 12th, we will focus on data storage and sharing options for the Institute. This is a critical piece of integration for EMBRIO. Lev Gorenstein, Sr. Computational Scientist with the Rosen Center for Advanced Computing at Purdue, will provide an overview of the Data Depot storage system and answer questions, followed by discussion and next steps for establishing a system of storing and sharing EMBRIO research data.

The Member Spotlight in this issue introduces [Dr. Anjali Iyer-Pascuzzi](#). We are thrilled to announce that Anjali is joining EMBRIO as DEI Director for the Institute and will be engaged in collaborations within Thrust 2. She will work closely with Dr. Ignacio Camarillo who leads outreach and recruiting efforts and the next leader, to be determined, of the EMBRIO Undergraduate research experiences program. Dr. Iyer-Pascuzzi will present her plans for DEI along with her research in Thrust 2 during the January 30th Weekly Update. We sat down with Anjali to ask her about her plans and her research. Read all about it in this issue's Member Spotlight.

This week in our Monday afternoon meeting slot we kicked off a trainee professional development series centered on grants. In this series trainees learn about funding agencies, the components and uses of a well-crafted aims page, and will draft and engage in peer review of their own aims page! The next session will be January 23rd (see details below) so mark your calendars to attend this valuable professional development opportunity.

A reminder that for Spring semester 2023, we will maintain our Monday 3pm (ET) time continuing Weekly Updates split between research talks, DEI topics, professional development trainings, and a monthly meeting for Thrust and Site Leaders. A calendar invite with a new Zoom link was emailed on 11/18. The schedule for January and February Weekly Updates is presented in this issue.

All EMBRIO members are invited to a Watch Party on Dec. 6 10:30-12:30 featuring student presentations in the Quantitative Systems Biology course taught by Drs. Umulis and Linlin Li. Details are in this issue.

We want to hear about your news and announcements. Send them to Brent (laddb@purdue.edu) by 12/9 for inclusion in the next issue of *Emergence*.

David, Chris, Stephanie, and Brent

Quotable Quote:

“Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less.” ~ [Marie Curie](#)

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 WATCH PARTY

On behalf of Prof. Umulis and Dr. Li, All EMBRIO members are invited to the Watch Party, December 6, 10:30am - 12:30pm(ET) Quantitative Systems Biology course student presentations. For Purdue students and faculty (not already in the course) who will attend in person, [please RSVP](#) by Friday Dec. 2, so that we can plan for enough pizza available. Santa hats optional.

In person: PURDUE, Room MJIS 2001

Join Zoom Meeting:

<https://purdue-edu.zoom.us/j/98100711659?pwd=Z3FrYkJKL241aGRXU0s0WTBDbkFIZz09>

Meeting ID: 981 0071 1659

Passcode: 918890

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/KZurTw5rwxYxYxE9>

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.

EMBRIO TRAINEE PROFESSIONAL DEVELOPMENT *GRANTS* SERIES

For trainees that missed the Grants session panel discussion Nov. 28th, the video recording and chat file are available on our Box account > Weekly Meeting Recordings > 2022-11-28_EMBRIO Weekly Update_Grants-Series_Prof-Dev_Session 1.

Direct link: <https://app.box.com/s/3py70qibjqbbzywss3zc95y8qksav2ib>

Thank you to the panelists for sharing your insights and experience! Drs. Jason Cannon, Alejandra Magana, Chris Staiger.

The next session in the series is scheduled for January 23, 3pm ET: De-Mystifying the Craft of Creating an Aims Page

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

January 23rd : De-Mystifying the Craft of Creating an Aims Page

February 20th : Students present draft Aims page for Peer-Feedback (Jazzmin Owens and Peter Brumm)

MEMBER SPOTLIGHT: Anjali Iyer-Pascuzzi



Dr. Anjali Iyer-Pascuzzi is an Associate Professor in the Botany and Plant Pathology Department at Purdue University.

Dr. Iyer-Pascuzzi has joined EMBRIO in a leadership role as *Diversity, Equity, and Inclusion Director* for the Institute. She brings expertise in research collaboration in Thrust 2 exploring how pathogen manipulation of cytoskeleton dynamics leads to changes in root tissues and enhanced disease. We sat down with Anjali to discuss her new position with the Institute.

How have you been involved in DEI efforts at Purdue and beyond?

I've served on the American Society for Plant Biology (ASPB)'s Equity, Diversity, and Inclusion committee (EDIC) since October 2020. In this capacity I've developed and led DEI-based workshops at the annual ASPB meeting, designed inclusive rubrics for evaluating trainee travel award proposals, and broadened awareness of DEI within the plant biology community. Prior to this work I was a member of the College of Agriculture Diversity Action Team in Agriculture (DATA) committee, where I contributed to organizing activities for MLK Day in the College. My program also plays a major role in a summer outreach with the Felege Hiywot Center (FHC) in Indianapolis. FHC serves low-income urban youth and aims to generate confidence through engagement in urban farming.

I'm also the PI of a National Needs Graduate Training Fellowship grant from the USDA that aims to comprehensively train students in plant-microbe interactions and data analysis. As part of this, I've lead grad student recruitment and mentoring, and organized lab rotations and journal club.

What are some of your ideas for leading DEI activities for EMBRIO?

As the leader of the DEI and Broader Participation Activities of EMBRIO, I will leverage my previous experiences and work with the leadership to develop DEI programming, encourage inclusion across EMBRIO and lower barriers to participation by all scientists. In the first year, I have the following goals:

Build trust in the DEI position within the EMBRIO community, particularly with early career scientists. I envision twice per semester lunches with graduate students and postdocs to listen to their experiences, learn what is going well and what can be improved in the DEI space. Active listening is a critical component of DEI work, and I will aim to ensure that all voices are heard.

Promote student and postdoc leadership within the center. Senior graduate students can be excellent ambassadors for diversity and inclusion, and I hope to engage these students as leaders in DEI and mentoring activities. This will include encouraging short workshops held by senior students that introduce junior graduate students to different aspects of graduate school (prelims or proposal writing, for example), or promoting student writing groups within the Institute.

Understand current opinions about DEI within the Institute through an anonymous survey, which will also include demographic information. I will work with other members of the EMBRIO leadership team and the Purdue Discovery Learning Center to conduct surveys about inclusivity and collect demographic data on a yearly basis.

Further inclusion and a sense of community: Good mentorship is a component of inclusion. I will introduce Individual Development Plan (IDPs) and/or mentorship compacts for post-docs and graduate students within the institute. I will promote the use of a short 'personal slide' at the beginning of research presentations to showcase the range of backgrounds and paths to success. I will also encourage the use of alternative text for presentations and posters.

Develop an action plan for challenging situations: During the first year, I will work with other EMBRIO faculty to develop a response plan if members of the EMBRIO community are victims of racial, sexual or gender-based harassment.

Your research lab brings expertise to the Institute contributing to Thrust 2 activity. Can you tell us more about your research and collaborations in this space?

Scientifically, my research is well-aligned with the mission of EMBRIO. My program aims to understand how soil microbes manipulate plant root physiology and development to cause plant disease or promote plant health. I am particularly interested in (1) how microbial perception in specific root cell types is signaled to surrounding tissues, and how those signals are integrated into phenotypic changes across the entire root system, and (2) how the bacterial pathogen manipulates host cell physiology to promote disease. My group has recently discovered a bacteria effector protein which interacts with the plant cytoskeleton and promotes pathogen virulence. In a collaborative project with Dr. Chris Staiger, we are exploring how pathogen manipulation of cytoskeleton dynamics leads to changes in root tissues and enhanced disease.

Research in my program takes a multi-scale approach, from the molecular and cellular scale to organ level. Imaging and image analysis is a major component of our work. To this end, I have collaborated with colleagues in engineering, math, and physics for nearly 15 years, both as a faculty member at Purdue and as a postdoc at Duke. I am excited about the possibility of working with EMBRIO and continuing to collaborate with Dr. Staiger and others in this area.

From the EMBRIO Leadership: *“We are excited to have Dr. Iyer-Pascuzzi join the Institute in this leadership role as our new DEI Director, and the expertise she will bring to Thrust 2 activity. Please welcome her to the Institute!”*

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/vJlsdeyhriwsG3qSI89jFIF9zUdzoYIz4Vw
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/vJlscOurqjoiGtH9Y_zDJPVHhg2Nm6zWNb0
Difficult Conversations, Conflict, and Feedback	Feb 8, 2023 12:00-2:15 pm ET	https://nih.zoomgov.com/meeting/register/vJlsc-CgrTsiHfcOa91MnLLO-_REOmdOO2I

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
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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=eVnY2owcm9kaFRtVUdPcmFHaGl1UTo9&from=addon>

- December 5 – Gregory Reeves, Assoc. Prof., Chem. Eng., TAMU
- December 12 – Data Platform Session, Lev Gorenstein, Rosen Center for Advanced Computing
- Winter Break (no meetings until Spring semester)

Spring Semester new Zoom link:

<https://purdue-edu.zoom.us/j/99819751005?pwd=UVlvWVpxRDB0cDVXbmxBU1NUTEZGZz09&from=addon>

- January 9 – Krishna Jayant, Asst. Prof., BME, Purdue
- January 16 – Martin Luther King, Jr. Day – No Meeting, please volunteer locally
- January 23 – Trainee Professional Development, Grants Series Session #2
- January 30 – Anjali Iyer-Pascuzzi, Assoc. Prof., BPP, Purdue, DEI Director, EMBRIO
- February 6 – Thrust & Site Leads Update Meeting
- February 13 – Priyanka Baloni, Asst. Prof, HHS, Purdue
- February 20 – Trainee Professional Development, Grants Series Session #3
- February 27 – Bakary Samasa, Mary Mullins Lab
- March 6 – Thrust & Site Leads Update Meeting
- March 13 – Spring break, no meeting

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

Dec. 6 Watch Party, December 6, 10:30am - 12:30pm (ET) Quantitative Systems Biology course student presentations. In person: PURDUE, Room MJIS 2001
Zoom: <https://purdue-edu.zoom.us/j/98100711659?pwd=Z3FrYkJKL241aGRXU0s0WTBDbkFIZz09>

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:

Let us know about your conference presentations.

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/frd9275xc069gmtbe3y1osozi7ssk7>), or they have graduated, let Brent know their names and email contacts (laddb@purdue.edu)

Submit your items for the next newsletter by Dec. 9 to Brent (laddb@purdue.edu)