



Emergent Mechanisms in Biology of
Robustness, Integration & Organization

“**EMBRIO NEWS**” : [Cast your vote](#) on submitted newsletter name ideas

September 7, 2022

DIRECTORS NOTE

Hello EMBRIO Community! These last few weeks have been a whirlwind with our NSF annual report due and getting year two budget requests in, all overlapping with the start of Fall semester. A huge thank you to everyone for your timely submissions of progress reports, requests, and responses that have allowed the Directors to meet the deadlines of our funding sponsor, NSF. You will find a bit more about our inaugural annual report in the Institute Spotlight, as well as a heads-up for an earlier than expected due date next year (July 1). Speaking of the BII program at NSF – all EMBRIO members are invited to participate in the upcoming virtual BII conference October 18-19 that will involve a dozen BII Institutes. More details will be forthcoming. Steph Gardner is leading a separately funded initiative titled CUREs (course-based undergraduate research experiences) and is calling for interested EMBRIO faculty to get involved – please see the callout under “Research & Education Integration”. This is an excellent opportunity for EMBRIO to make advancements in Thrust 4 within an educational research framework. We are looking forward to seeing everyone next Monday during our Weekly Update. EMBRIO graduate students Shelly Tan and Chang Ding with Qing Deng’s lab will be presenting, and they are both featured in this edition’s Member Spotlight. Don’t forget to take a minute to [vote on our new Newsletter name](#) from Member submitted ideas...and send your news and announcements for the next newsletter to Brent (laddb@purdue.edu) by 9/15.

David, Chris, Stephanie, Brent, and Carl

QUICK LINKS

[EMBRIO BII NSF Annual Report 2022](#)

[CUREs Participation Interest Survey](#)

Matt Thompson Thesis Defense, September 14 at 11:30, MJIS 2001, Purdue:
[Zoom option](#) .

Propose a Zoom Breakout Group Topic for Oct. 3 Weekly Update (Email: Laddb@purdue.edu)

[Cast Your Vote for EMBRIO Newsletter name](#)

[Weekly EMBRIO Research & Education Meeting Zoom Link \(Mondays at 3 – 4pm\)](#)

INSTITUTE HIGHLIGHT

Thank you to everyone involved in reporting efforts to provide the required annual progress update to our NSF BII Program Director in stewardship of our NSF Award. It's an undertaking to pull together, and your timely responses helped the job go smoothly. The report was submitted on time with all necessary documentation and has been approved by NSF. We will look forward to, and will share, any feedback from NSF. EMBRIO Members can access the complete PDF of the Institute's Year 1 report on Box: [EMBRIO BII NSF Annual Report 2022](#)

Now, here's the kicker and a heads-up for next year: We received word from our NSF Program Director, Wilson Francisco, that because of an overlapping program requirement at NSF, our Year 2 BII report will be due July 1, 2023. This means we'll need to start *much* earlier on investigator progress reports. Our timeline was very compressed this year, and rather than squeeze a larger Y2 report into one month like we did this year, we anticipate a two-month process starting in early May.

RESEARCH & EDUCATION INTEGRATION: CUREs PROGRAM OPPORTUNITY

Want to broaden access to undergraduate research experiences in integrative biology? CUREs could be an answer! Course-based Undergraduate Research Experiences (CUREs) are a way to allow more and diverse students the opportunity to experience research by embedding real research projects into courses students might take as part of their normal coursework. CUREs can be a full-semester course in which the focus is the work on the research project, or they can be a multi-week research module embedded within a course.

Stephanie Gardner has worked with instructors in one-on-one or in cohort models to train and support them as they develop and teach CUREs. Within the EMBRIO Institute engaging students in interdisciplinary research is a priority, incorporating imaging, simulation and computation, as relevant to the project. Stephanie is excited to work with interested EMBRIO graduate students, postdocs, research scientists, and faculty on CUREs.

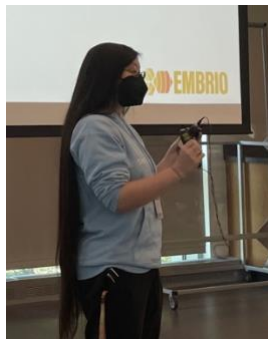
To gauge interest and help with planning, please complete this brief interest survey by September

23rd: https://purdue.ca1.qualtrics.com/jfe/form/SV_29tas2RkBAA5e8S

INFORMAL CONVERSATION/COLLABORATION Zoom BREAKOUT GROUPS:

Are you looking for a collaborator? Would you like to get conversation started about a specific research topic with other EMBRIO members? Beginning in October we will dedicate time during one or more Weekly Update meetings each month to allow for all participants to get-to-know each other a little better and have more opportunity to informally connect and discuss research and collaboration next steps. The person/people who propose a research topic for discussion, or a “*looking for a collaborator on [fill in your topic]*” will orient the breakout group by taking a few minutes to introduce the project or topic. People can choose to join a group at-will. For those *not* looking for a collaborator(s) or not interested in the available research topics that week will have an option to join an informal “get to know each other” chat group. We’ll also designate a “students only” breakout group for any of our trainees who want to chat with other students, however, students are encouraged to join other breakout groups as they desire. **Email me (Brent, laddb@purdue.edu) with your breakout group topic for October 3 Weekly Update session.**

MEMBER SPOTLIGHT: Shelly Tan



Shelly Tan is a graduate student in the Qing Deng Lab, Biological Sciences Department, Purdue University. She will co-present research during our upcoming Weekly Update, September 12.

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

I'm a townie! I was born in New Jersey but moved here to West Lafayette early enough that I don't remember much. I count myself pretty lucky to have grown up in such a nice place, honestly - having a university campus nearby enabled a lot of opportunities I definitely would not have gotten otherwise.

What are your hobbies?

Most people know this already, but my primary pastime when I'm not in the lab is digital illustration - distinct from graphic design! It's basically just painting, but on a digital canvas instead of a physical one. I like doing character illustrations most!

That being said, I do a lot of other stuff when I have the time for it. I like to cook and play video games, and I'm a big stationery enthusiast as well - still on the hunt for my holy grail fountain pen, but the Pilot Vanishing Point EF is pretty close.

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

Ever since I was a kid, I was motivated by this really strong intrinsic curiosity (to the point of injury, sometimes - there was this incident involving the hinge side of a door and my own fingernails that I vaguely recall from my preschool years). Living so close to a college campus allowed me to get a feel from a very young age for what comprised an academic mindset, so I think I ended up growing into the role naturally. It's hard to find this level of intellectual freedom and self-driven progress in most other jobs, and I suspect that if I were doing anything

else, I'd get bored very quickly.

In the grand scheme of things, it's nice to finally have the training to both properly ask and rigorously answer the questions that have defined my engagement with the natural world for so long. It's been a long road, but I'm glad to be here!

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

My project is part of Thrust 3B, and it focuses on the intersections between calcium signaling and actin cytoskeleton rearrangement in the zebrafish wounding model. The calcium wave and epithelial contraction seen in the embryonic zebrafish fin fold immediately post-injury are conserved between multiple phyla, but their respective roles in the overall wound healing process (especially in this system) are poorly understood. Using chemical and genetic tools, we aim to characterize the mechanisms underlying these coordinated whole-tissue signals in vivo, as well as to interrogate how their particular intersections support the complex morphology that typically comprises the vertebrate wound response.

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!):

I cut up baby zebrafish and then take pictures! Haha, maybe that's an oversimplification, but it does teach us a lot about how cells "talk" to each other when the tissue they're part of is injured, and how they rearrange in response to damage. Using special dyes and microscopy, we can visualize the chemical language they use to communicate - a language that's evolutionarily conserved from fruit flies all the way to human cells.

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

If graduating in the age of COVID has taught me one thing, it's to not make plans too far in advance. Given we're currently experiencing "once in a generation" events every other week, let's just say I'm keeping my options open and trying to get involved in as much cool stuff as I can!

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

All my social media is under a pen name for privacy reasons, so unfortunately I don't have any links to share. Keep an eye on this space, though - that might change in the near future!

MEMBER SPOTLIGHT: Chang Ding



Chang Ding is a graduate student in the Qing Deng Lab, Biological Sciences Department, Purdue University. She will co-present research during our upcoming Weekly Update, September 12.

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

I am from Harbin, a city in the northeastern part of China. It is also called ice city for its freezing temperature in the winter. It could even get to -35 degrees at midnight, thus I could definitely tolerate Purdue's winter.

What are your hobbies?

I am very interested in photography but not talented at taking pictures, LOL. Even though I tried hard to read books that tell about how changing angles could make pictures look a lot different than it used to, I seldom get one that I like when I have my camera with me.

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

I guess it is out of curiosity, and I think most scientists are curious about the questions they ask. Or it will be hard to keep me working in the lab when I am not curious about what will happen after handling fish, LOL.

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

My project is also in Thrust 3B and I am working on revealing the role that reactive oxygen species (ROS) play in the zebrafish tailfin wound healing process. Our preliminary data support that the ROS promotes tissue relaxation after the initial wound contractions. The goal is to determine the mechanism of how ROS provides negative regulation of wound contraction, and model the calcium-ROS-actin regulation in the tissue mathematically.

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!):

In order to know more about the mechanism that I am studying, we usually either treat fish with some drug or inject some other drugs into their embryos. After comparing their responses with fish without any treatment, we will be able to determine whether targeted components are affecting the signaling pathway.

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

I am always a person that plans ahead and gets prepared for those things even though sometimes it is too early to do so.

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

I don't have any of those social media :), and I never post myself on social media. LOL Maybe I will get one in the future.

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=elVnY2owcm9kaFRtVUdPcmFHGl1UT09&from=addon>

- September 12, Presenters: Shelly Tan & Chang Ding (Qing Deng Lab), GuangJun Zhang Lab.
- September 19, Presenters: Juana Mendenhall Lab, Aritra Chatterjee (Deva Chan Lab)
- September 26, Presenters: Jeremy Zartman Lab, Sharon Minsuk (James Glazier Lab)

September 14: EMBRIO THESIS DEFENSE:

Ph.D. Candidate, Matthew Thompson, with the Umulis Lab, will defend his dissertation September 14 at 11:30 in MJIS 2001 on the Purdue Campus. Everyone can join via [Zoom option](#) . *If you (or a mentee) have a thesis defense coming up, let us know!*

Advancing Interdisciplinary Undergraduate STEM Education for Increased Workforce Preparation

Virtual Workshop, September 21, 2022 | 2:00 - 3:30 PM ET

[Workshop Information and Registration](#)

September 23, 2022. EMBRIO Related Talk.

Chris Staiger will present an in-person talk titled “*Cooperative actin filament nucleation in the homeostatic cortical array of plant cells*” at the Chicago Cytoskeleton meeting on Friday, September 23. For more information about the meeting visit the CC website:

<https://chicagocytoskeleton.net/>

September 23, 2022. Response Deadline for Interest in CUREs Program

To gauge interest and help with planning, please complete this brief interest survey for participation in Course-based Undergraduate Research Experiences

(CUREs): https://purdue.ca1.qualtrics.com/jfe/form/SV_29tas2RkBAA5e8S

October 12-15, 2022. The [Biomedical Engineering Society \(BMES\) 2022 Annual Meeting](#) will be held in San Antonio, Texas. Registration is open.

October 18-19, 2022. Our [NSF Biology Integration Institutes Annual Conference](#) will be held virtually and run by NSF BII Program Officers. ALL EMBRIO members are encouraged to participate, as you are able. Registration link, schedule, and topic session details are forthcoming. Each day is forecast to run from 10am – 5pm EST. At this early-stage discussions are focused on sessions that are most useful for developing successful institutes, team science and overcoming integration challenges, NSF expectations, student perspectives on interdisciplinary mentoring, methods and lessons learned on data sharing and management, and modeling approaches in common with most BII's. Stay tuned for more information.

Nov. 9 – Nov. 12: The [Annual Biomedical Research Conference for Minoritized Scientists \(ABRCMS\)](#) is a go-to conference for underrepresented groups in STEM fields.

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. **DEADLINE for submissions is September 14.**

Hot Off the Press: New EMBRIO Papers

Matthew J. Thompson, Vidhya Munnamalai, **David M. Umulis** (8/30/2022) Early precision of radial patterning of the mouse cochlea is achieved by a linear BMP signaling gradient and is further refined by SOX2.

bioRxiv 2022.08.30.505910; doi: <https://doi.org/10.1101/2022.08.30.505910>

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.”**

Awards

National Science Foundation Faculty Early Career Development (CAREER) Awards: Congrats to [Elsje Pienaar](#), Assistant Professor of Biomedical Engineering (College of Engineering), for [Complexity From Simplicity: Multi-scale Computational Deciphering of the Viral Life Cycle](#). The award, granted as part of the American Rescue Plan Act of 2021, will use a combination of experimental data and computer simulations to understand and predict the complex interactions that drive Ebola virus infection. Such an understanding will allow the identification of any weak points in this protein network that can be targeted with new drugs.

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/frd9275xc069gmtbe3y1oso21j7ssk7>), or they have graduated, let Brent know their names and email contacts (laddb@purdue.edu)

Submit your items for the next newsletter by Sept. 15 to Brent (laddb@purdue.edu)