

ESIC CURRENTS

February 7, 2025



ENERGY SYSTEMS INNOVATION CENTER

**An Energy Center Focused
On Education, Outreach,
and Research**

CONTACT US

Jake Baumgartner, ESIC Industry
Relations Coordinator
PO Box 642752, Washington State
University
Pullman, WA 99164-2752
Phone: 509-335-6456
Email: jacob.baumgartner1@wsu.edu
Website: esic.wsu.edu

Visit our website to learn more about
ESIC, memberships and how you can
become part of the ESIC community.

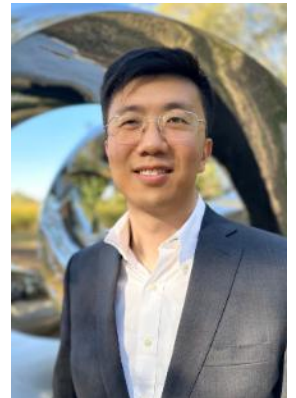
**ESIC Research Excellence Partnership
Membership (REP)** – Enabling
excellence in research

**ESIC Power Education Partnership
Membership (PEP)** – Supporting
power education

UPCOMING EVENTS ...

PSERC SEMINAR, WEDNESDAY, 2/12/25

Our next PSERC Seminar will be **Wednesday, Feb. 12 10am-11am**, featuring **Richard Y. Zhang** from the University of Illinois at Urbana-Champaign. Richard Y. Zhang will be presenting on **Power System State Estimation by Phase Synchronization and Eigenvectors**. To access the webinar, as well as the presentation announcement, follow this link: [PSERC Webinar page](#). A schedule of upcoming PSERC Webinars is also posted on this site.



Additionally, you can access the PSERC Webinar by joining via the [ESIC Seminar TEAMS Link](#), as we will be making the webinar available for ESIC faculty, students, staff, and industry partners.

Missed out on a seminar? All ESIC seminars are recorded and posted to our website, click [HERE](#) to go back and watch videos from earlier seminars.

SPRING 2025 PRACTICUM UPDATE ...

STUDENT SELECTION COMPLETED

ESIC has completed its search for this year's Spring practicum students. We are incredibly excited to connect our students with our industry partners to continue building the next generation of power engineers.

We will be in touch with our industry partners with more information regarding students that they will be working with.

STUDENT ENGAGEMENT ...

ANNOUNCING OUR NEXT "STUDENT SPOTLIGHT" FEATURE ON LINKED IN

We invite you to view our Student Spotlight on [LinkedIn](#). Each week, Pearl Miglani, our intrepid communications coordinator, interviews ESIC students to provide a glimpse into their experiences, goals, and personal insights on the future of power engineering! This week's featured student is **Haoyu Ma**.



GUIDING STUDENTS TO POWER ENGINEERING

As academics, fellow students, and industry stakeholders, you all have the potential to guide and mentor high school students and college undergraduates interested in working towards a power engineering degree. If you know of such a student, please encourage them to visit our [ESIC website](#) to find out more or ask them to contact us at esic.center@wsu.edu.

FOLLOW US ON LINKEDIN

To stay up-to-date on all things concerning ESIC and power engineering, follow us on our [LinkedIn](#) page where we post seminar updates, scholarships, job openings, and so much more!



PSERC WEBINAR

Power System State Estimation by Phase Synchronization and Eigenvectors

Richard Y. Zhang

University of Illinois at Urbana-Champaign

To estimate accurate voltage phasors from inaccurate voltage magnitude and complex power measurements, the standard approach is to iteratively refine a good initial guess using the Gauss–Newton method. But the nonconvexity of the estimation makes the Gauss–Newton method sensitive to its initial guess, so human intervention is sometimes needed to detect convergence to plausible but ultimately spurious estimates. In this talk, we make a novel connection with the phase synchronization in signal processing to yield two key benefits: (1) an exceptionally high quality initial guess over the angles, known as a spectral initialization; (2) a correctness guarantee for the estimated angles, known as a global optimality certificate. These are formulated as sparse eigenvalue-eigenvector problems, which we efficiently compute in time comparable to a few Gauss-Newton iterations. Our experiments on the complete set of Polish, PEGASE, and RTE models show, where voltage magnitudes are already reasonably accurate, that spectral initialization provides an almost-perfect single-shot estimation of n angles from $2n$ moderately noisy bus power measurements (i.e. n pairs of PQ measurements), whose correctness becomes guaranteed after a single Gauss–Newton iteration. For less accurate voltage magnitudes, the performance of the method degrades gracefully; even with moderate voltage magnitude errors, the estimated voltage angles remain surprisingly accurate.

FEBRUARY 12, 2025

[LINK TO WEBINAR](#)

1:00-2:00 P.M. ET

(10:00-11:00 A.M. PT)

Richard Y. Zhang is an Assistant Professor in the Department of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign. He received the B.E. (hons) degree with first class honours in Electrical Engineering from the University of Canterbury, Christchurch, New Zealand, and the S.M. and Ph.D. degrees in Electrical Engineering and Computer Science from MIT. Before joining the University of Illinois, he was a Postdoctoral Scholar at the University of California, Berkeley. His research interests are in optimization and machine learning, and applications in power and energy systems. He is particularly interested in theoretical foundations and practical algorithms for nonconvex low-rank matrix optimization and convex semidefinite programming. He is a recipient of the NSF CAREER Award in 2021.

