

LET'S TALK RESEARCH

# NSF Proposal Types

A workshop about introducing Convergence Accelerator, CRII, EAGER, ERI, IUCRC, and standard proposals

OFFICE OF THE VICE CHANCELLOR FOR RESEARCH &  
DEAN OF THE GRADUATE SCHOOL



Time: 9:30 am - 11:30 am, April 3, 2023  
Zoom Meeting ID: 997 4307 7738, Passcode: 760358

**SIU**  
CARBONDALE

## Panelists:

- ▶ Dr. Yong Gao (Associate Professor, School of Chemical and Biomolecular Sciences)
- ▶ Dr. Ruopu Li (Associate Professor, School of Earth Systems and Sustainability)
- ▶ Dr. Sabrina Nilufar (Assistant Professor, School of Mechanical, Aerospace, & Materials Engineering)
- ▶ Dr. Sajedul Talukder (Assistant Professor, School of Computing)
- ▶ Dr. Jale Tezcan (Interim Director & Professor, School of Civil, Environmental and Infrastructure Engineering)
- ▶ Dr. Spyros Tragoudas (Director & Professor, School of Electrical, Computer and Biomedical Engineering)

# Proposal Types/Programs

- ▶ Standard Research Proposal
- ▶ EAGER
- ▶ ERI
- ▶ CRII
- ▶ Convergence Accelerator
- ▶ I-UCRC
- ▶ Many others

# Standard Research Proposal

- ▶ Find out which program supports your research area. Study the NSF website.
- ▶ Read the program announcements carefully. It is recommended to contact the program director early. The easiest way to get started is to send a brief email to the program director stating which program you are interested in applying to, a short statement of your relevant research interests, your availability by phone or email, and a one-page attachment that covers: what's the problem, why it's important, and what your key idea is.
- ▶ Volunteer to be part of a review panel. They always need panelists.
- ▶ Use PIVOT to be informed of NSF research opportunities in your area.

# Standard Research Proposal

- ▶ Do not submit a proposal that is rushed and not the best that you can do.
- ▶ Some programs have hard deadlines, while some has no deadline (proposals will be accepted throughout the year). Check your own program.
- ▶ All proposals are evaluated against two criteria: intellectual merit and broader impacts. You need to convince the reviewers that your question is not just intellectually challenging, but also that the resulting knowledge will benefit society and that you have a feasible plan to get the knowledge out of the university and get it used in the world.

# Early-concept Grants for Exploratory Research (EAGER) Proposal

6

- ▶ Support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches.
- ▶ This work may be considered especially "high risk-high payoff" in the sense that it, for example, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives.
- ▶ The EAGER mechanism requires researchers to generate their proposal quickly. NSF wants to use this mechanism to address problems facing society now, using research teams who are ready to tackle the problems. So, the program officers were quick to offer feedback and move forward with our proposal.

# EArlly-concept Grants for Exploratory Research (EAGER) Proposal

7

- ▶ Project Description: **brief**, must be no more than eight pages. It must include clear statements as to why this project is appropriate for EAGER funding, including why it does not fit into existing programs and why it is a good fit for EAGER. No deadlines.
- ▶ **Only internal merit review** is required for EAGER proposals. Under rare circumstances, Program Officers may elect to obtain external reviews to inform their decision.
- ▶ Connection with the program and program officer are key success factors.
- ▶ In many cases you can get an EAGER award during a visit to a program officer.

# Engineering Research Initiation (ERI) Program

8

- ▶ The NSF Directorate for Engineering (ENG) seeks to build engineering research capacity across the nation by investing in new academic investigators who have yet to receive research funding from Federal Agencies. The Engineering Research Initiation (ERI) program will support new investigators as they initiate their research programs and advance in their careers as researchers, educators, and innovators.
- ▶ This funding opportunity aims to broaden the base of investigators involved in engineering research and therefore is limited to investigators that are not affiliated with “very high research activity” R1 institutions (according to the Carnegie Classification).



# Engineering Research Initiation (ERI) Program

9

- ▶ At the time of the proposal submission deadline, the PI may not have been a PI, Co-PI or equivalent on any current or prior awarded NSF research grant (including subaward) or have had research support from any other Federal Agency (within the United States or abroad).

# CRII

10

- ▶ Computer and Information Science and Engineering Research Initiation Initiative (CRII)
- ▶ Supports early-career scientists in computer and information science and engineering who lack access to adequate organizational or other resources
  - ▶ Means not R-1 institutions
  - ▶ You can only submit 2; only one per year
  - ▶ Cannot have any other Federal grant or contract as a PI
- ▶ Must be in the first three years in a primary academic position after the PhD, but not more than six years after completion of the PhD for proposals submitted in 2022, and not more than five years after completion of the PhD for proposals submitted after 2022.

# Convergence Accelerator

- ▶ New Directorate of Technology, Innovation, and Partnership (TIP)
  - ▶ Established through the CHIPS and Science Act
- ▶ The goals of the NSF's **Convergence Accelerator** are to *accelerate use-inspired convergent research* in areas of national importance and societal and economic challenges, and to initiate convergent team-building capacity around exploratory, potentially high-risk proposals addressing selected convergent research topics.
- ▶ Each year the solicitation focuses on different areas. In 2023 these are (communicated in March 3, 2023):
  - ▶ Equitable Water Solutions
  - ▶ Real-World Chemical Sensing Applications
  - ▶ Bio-Inspired Design Innovations

# I-UCRC

12

- ▶ Dr. Tragoudas will discuss during his presentation

# Others

- ▶ CAREER
- ▶ Partnerships for Innovation – APEX (Allowable Patent Expenses)
- ▶ Engines
- ▶ GRANTED
- ▶ SBIR/STTR
- ▶ I-CORPS
- ▶ REU
- ▶ Check the web site. Register in PIVOT



## Dr. Yong Gao

Associate Professor, School of Chemical and Biomolecular Sciences, SIUC

E-mail: [ygao@chem.siu.edu](mailto:ygao@chem.siu.edu)

Phone: 618-453-4904

***Standard, SBIR/STTR, I-Corps,  
and PFI proposals***

# NSF Translation Research Programs

15

New: Directorate of Technology, Innovation, and Partnership (TIP)

- ▶ I-Corps team: an entrepreneurship education program (\$50K). The team is comprised of a PI, a student, and an industrial partner.
- ▶ Partnerships for Innovation (PFI): PFI-TT (\$550K) for 2 years and PFI-RP (\$1M) for 3 years. I-Corps is usually pre-required.
- ▶ SBIR/STTR: phase I (\$256K) for 1 year, phase II (\$1M) for 2 years. SIU can receive 40% of the total budget.



## Dr. Ruopu Li

Associate Professor, School of Earth Systems and Sustainability, SIUC

Email: [ruopu.li@siu.edu](mailto:ruopu.li@siu.edu)

Phone: 618-453-6038

Office: 4543 Faner Hall

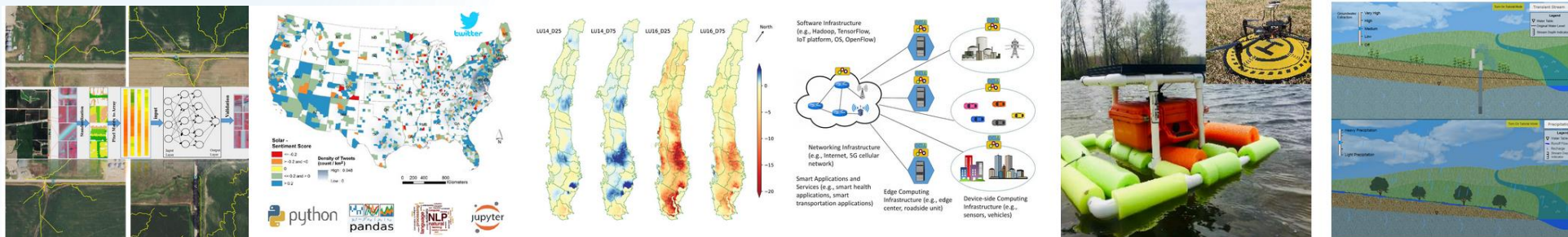
***EAGER***



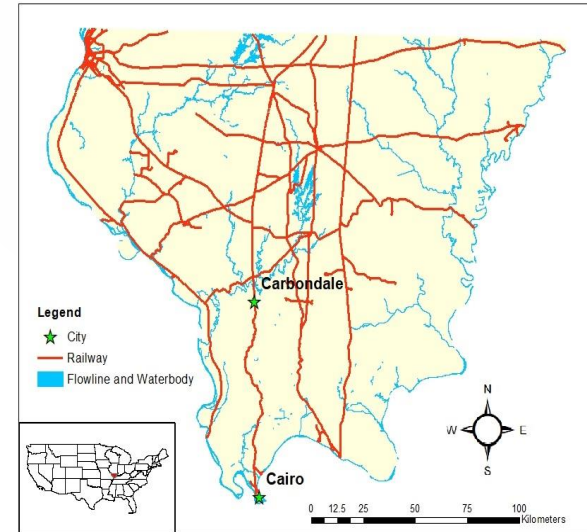


## ► Research Background

- Geoinformatics for Food, Energy, and Water (GeoFEW) Lab (<https://geofew.org>)
- Water resources sustainability under climate change
- Agricultural land use
- Energy Geography incl. renewable energy and energy perception
- Emerging technologies (e.g., drones, GeoAI, social media)
- Digital inequalities – smart divide



- ▶ EAGER: SAI: Understanding and Bridging the Smart Technology Infrastructure Divide in Rural America
  - ▶ Strengthening American Infrastructure (**SAI**) program
  - ▶ An interdisciplinary project that converges Geography, Sociology, and Electrical and Computer Engineering
  - ▶ Concerning social inequalities associated with the development of smart society and community
  - ▶ **Smart divide** – an advance from digital divide
  - ▶ Study areas include Carbondale and Cairo
  - ▶ Working to develop the first rural smart development plan



- ▶ Highlights for writing an EAGER grant
  - ▶ Novel, transformative, and high-risk and high-reward idea(s)
  - ▶ Up to **eight** pages
  - ▶ Not involving in traditional panel review processes
    - ▶ It can be directly decided by the PDs who cares more about policies but know less about your research areas
  - ▶ Some NSF programs allow EAGER, but some don't
  - ▶ Recently, EAGER opportunities may be announced by DCLs
  - ▶ Be prepared (not the last-minute thought)
  - ▶ Interdisciplinarity is welcome



## Dr. Sabrina Nilufar

Assistant Professor, School of Mechanical,  
Aerospace, & Materials Engineering, SIUC

Email: [sabrina.nilufar@siu.edu](mailto:sabrina.nilufar@siu.edu)

Phone: 618-453-1167

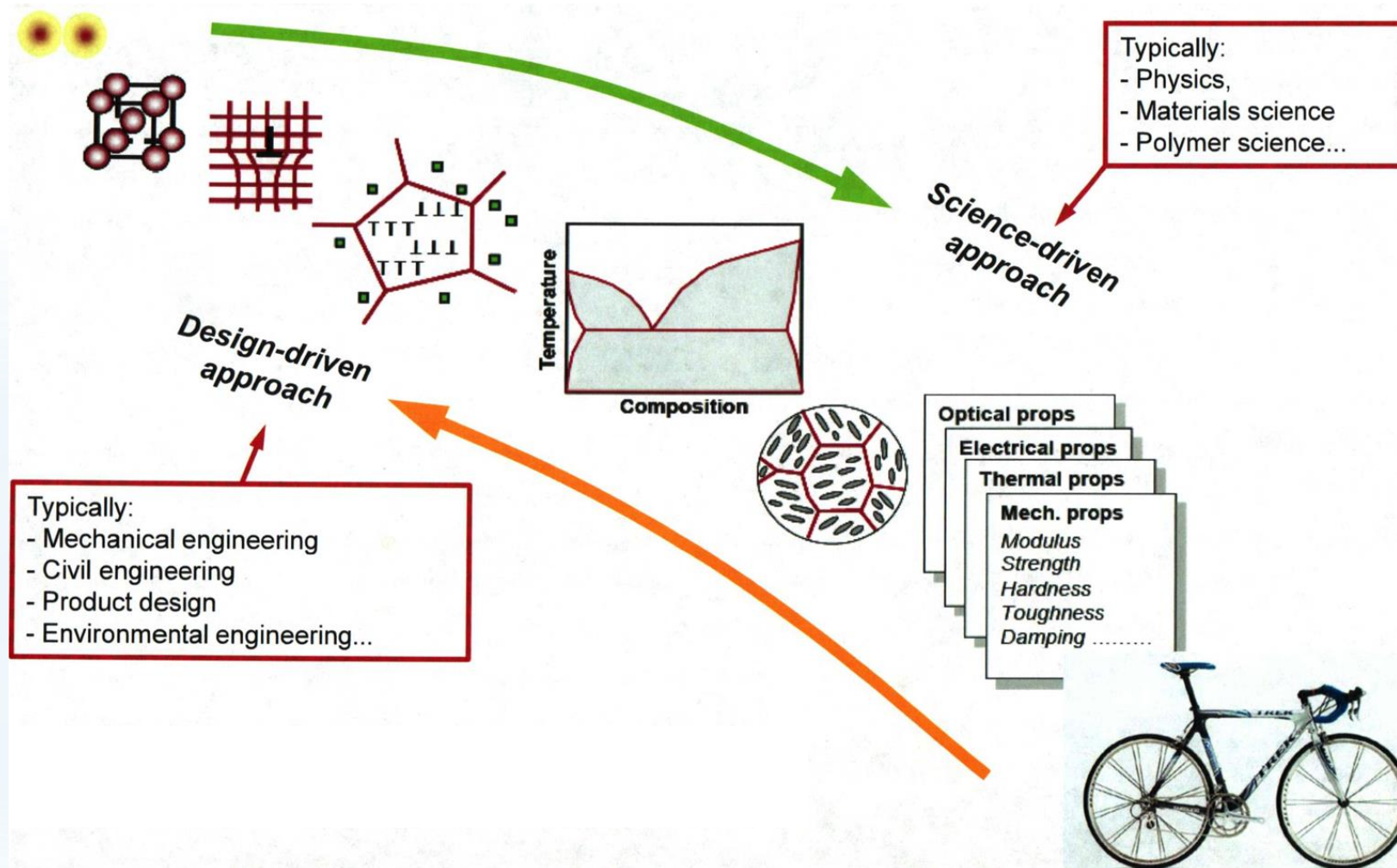
Office: ENGR E12

***ERI***



# “The Big Picture”

21



# Research Thrusts

22

## Next Generation Materials

“Metal Covetics”



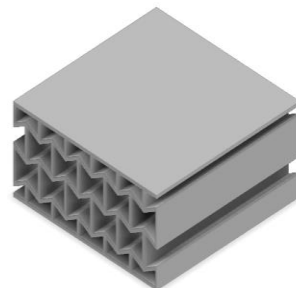
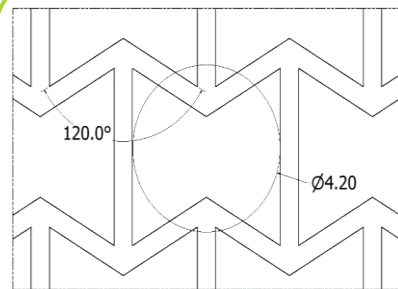
Section of Cu extrusion



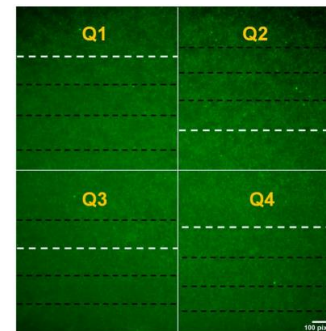
Additive  
Manufacturing of  
Polymers

Rigid Materials

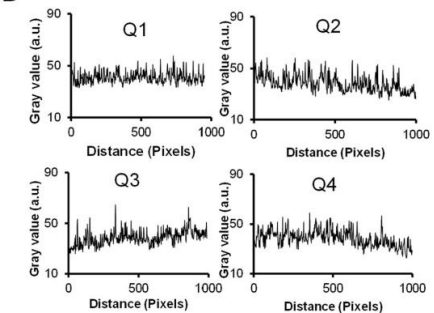
Soft Materials



A

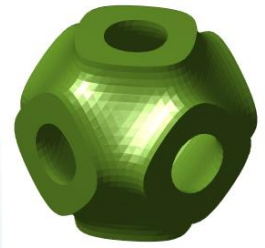


B

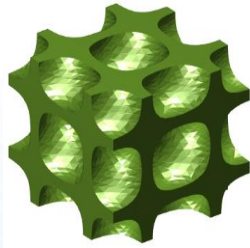


# ERI: Understanding the Thermomechanical Response of Sandwich Structures with Triply Periodic Minimal Surface

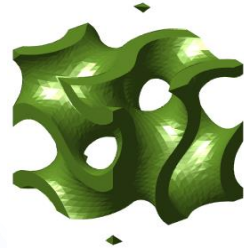
23



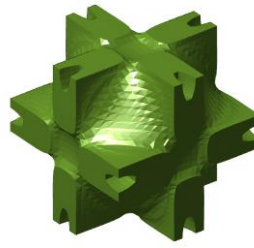
Primitive



Diamond



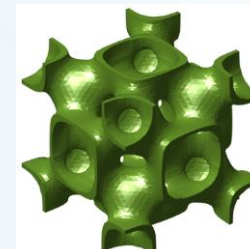
Gyroid



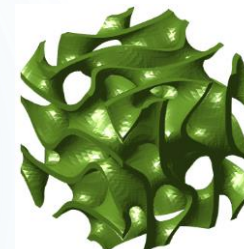
Neovius



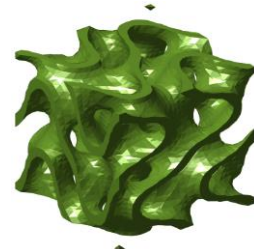
I-WP



F-RD



I<sub>2</sub>-Y



F-K





# Points to be noted for ERI

24

## Eligibility for ERI (Institution)

- ▶ ERI proposals may only be submitted by Institutions of Higher Education (IHEs) not currently classified as a Doctoral University with “Very High Research Activity” (R1 institutions).
- ▶ This eligibility is based on Classification on the proposal submission deadline date.





# Points to be noted for ERI (cont.)

25

## Eligibility for ERI (PI)

- ▶ The PI may not have been a PI, Co-PI, or equivalent on any current or prior awarded NSF research grant (including subaward) or have had research support from any other Federal Agency, with some exceptions such as:
  - Conference or travel awards;
  - Doctoral dissertation improvement grants and any other award made while the PI was a student, including NSF Graduate Research Fellowships;
  - Postdoctoral research fellowship awards that exclusively support pre-tenure-track activities;
  - Major Research Instrumentation grants (NSF MRI or equivalent) as PI or Co-PI;
  - REU or RET site awards, I-Corps, Phase I SBIR, or STTR awards;
  - Awards that originated as Federal funds but were distributed locally without naming the submitting ERI PI in the Federal funding proposal (such as: NASA Space Grant Project.); and
  - Awards that originated as Federal funds but were not for research purposes (this must be described in the Chair's letter.)



# Points to be noted for ERI (cont.)

26

## Other Highlights

- ▶ An individual may serve as Principal Investigator (PI) or Senior Personnel on only one ERI proposal per deadline.
- ▶ Only one PI per proposal is allowed. Co-Principal Investigators (Co-PI) are not allowed.
- ▶ Postdoctoral researchers are not eligible to serve as PI on an ERI proposal.
- ▶ Some NSF programs allow ERI such as CBET, CMMI, and ECCS.
- ▶ Full Proposal Deadline (due by 5 p.m. submitter's local time) is on September 15, 2023.
- ▶ Project Description has a 10-page limit.





## Dr. Sajedul Talukder

Assistant Professor, School of Computing, SIUC

Email: [sajedul.talukder@siu.edu](mailto:sajedul.talukder@siu.edu)

Phone: 618-453-6059

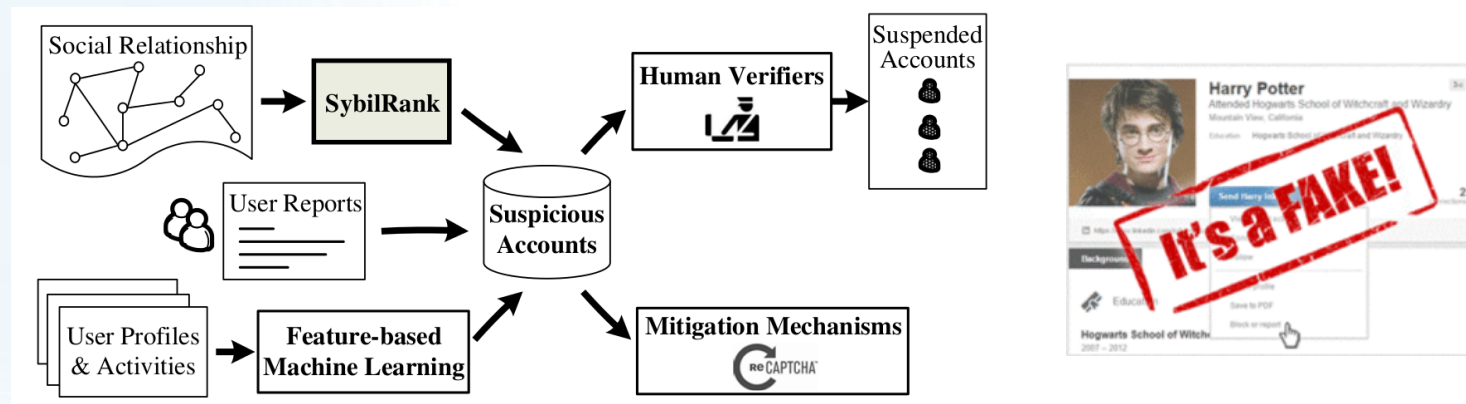
Office: Engineering A0407

***CRII***

- ▶ Research Background
  - ▶ Director, Security and Privacy Enhanced Machine Learning (SUPREME) Lab
  - ▶ Security & Privacy
  - ▶ Machine Learning
  - ▶ Online Social Networks
  - ▶ Distributed Systems
  - ▶ Abuse Detection
  - ▶ AI for Social Good

- ▶ CRII: SaTC: A Framework to Defend Against Sockpuppet Connection Requests in Social Networks
  - ▶ Social networks like Facebook are a playground for cyberstalkers, identity thieves, scammers and abusers.
    - ▶ Steal sensitive information and use it to spam, spear-fish and even distribute malware
    - ▶ Facebook estimated that 13% (i.e., 270 million) of their user accounts are either bots or clones.
  - ▶ Friend Spam Attack: get friend invitations from strangers
    - ▶ Accepting friend requests from strangers exposes users to further attacks
    - ▶ User data is shared with friends by default

- ▶ CRII: SaTC: A Framework to Defend Against Sockpuppet Connection Requests in Social Networks
  - ▶ expand the understanding of identity deception and abuse in online social networks, and design and build intervention mechanisms to mitigate these types of attacks.
  - ▶ build a digital framework rooted in cognitive psychology, UX research, and machine learning methods to defend against sockpuppet connection requests in online social networks





## ► Areas for writing a CRII grant

- Anything that fits within any of the NSF CISE research programs
- Office of Advanced Cyberinfrastructure (OAC)
  - OAC Core Research
- Computing and Communications Foundations (CCF):
  - Algorithmic Foundations (AF)
  - Communications and Information Foundations (CIF)
  - Software and Hardware Foundations (SHF)
  - Foundations of Emerging Technologies (FET)

## ► Computer and Network Systems (CNS):

- Computer Systems Research (CSR)
- Networking Technology and Systems (NeTS)
- CISE Education and Workforce (EWF)
- Cyber-Physical Systems (CPS)
- Secure and Trustworthy Cyberspace (SaTC)

## ► Information and Intelligent Systems (IIS):

- Information Integration and Informatics (III)
- Human-Centered Computing (HCC) - formerly Cyber-Human Systems (CHS)
- Robust Intelligence (RI)
- Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (SCH) – formerly Smart and Connected Health

## ► **Program sites have more information on topics for each program**



## **Dr. Jale Tezcan**

Interim Director & Professor, School of Civil,  
Environmental and Infrastructure Engineering,  
SIUC

Email: [jale@siu.edu](mailto:jale@siu.edu)

Phone: 618-453-6125

Office: Engineering B, Room 32

## ***Convergence Accelerator***





## Dr. Spyros Tragoudas

Director & Professor, School of Electrical,  
Computer and Biomedical Engineering, SIUC

Email: [spyros@engr.siu.edu](mailto:spyros@engr.siu.edu)

Phone: 618-453-7027

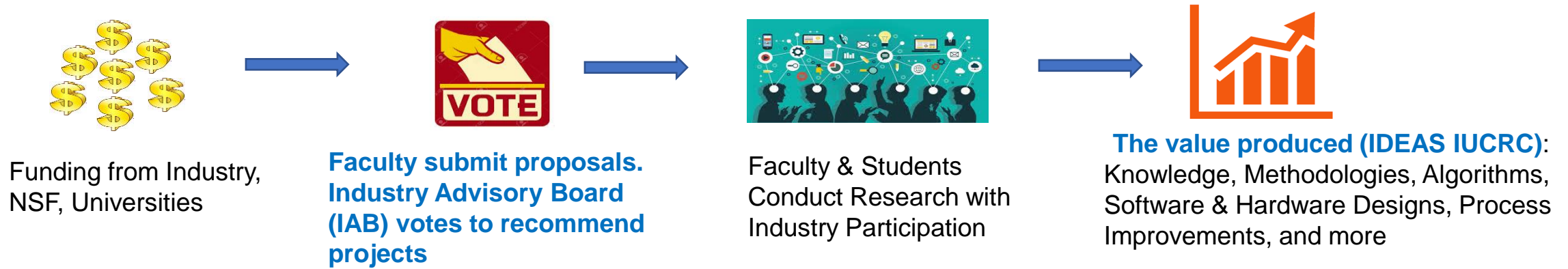
Office: Engineering E-202B

***I-UCRC***

# Experience in Directing IUCRCs

- ▶ **Director, Consortium for Embedded Systems (CES) at SIUC, an NSF IUCRC, Phases I&II: 2009 – 2022**
  - ▶ Participating universities: Arizona State University (Lead) and SIUC
  - ▶ Approximately \$3M dollars in research projects at SIUC funded by member industries
  - ▶ Member industries primarily in semiconductors, automotive, aerospace
- ▶ **Director, Intelligent, Distributed Embedded Applications & Systems (IDEAS) at SIUC, an NSF IUCRC, Phase I: 2023 – 2028**
  - ▶ Participating Universities: Arizona State University (Lead), SIUC, University of Southern California

# How an IUCRC Works



## Industry Advisory Board (IAB):

- Is made up of representatives from the Center's member organizations
- Minimum annual IAB membership fee is \$75K

## Role of the IAB:

- Establish the Center's research agenda, bylaws, research portfolio, technology roadmap
- Select, monitor and mentor projects

## Center Funding:

- IAB membership fees fund only research
- NSF funds 100% of administrative costs
- Universities contribute by limiting overhead to 10% on membership fees

**Research Outcomes:** All members share resulting IP of projects from all universities

<https://iucrc.nsf.gov/industry/joining-a-center/membership-agreement/>

# Membership Fee – Value Proposition

Industry Purchases Annual Memberships  
(for \$75K at the IDEAS IUCRC)



Membership fees fund research projects:



Funding Model by Contribution Per Year

## Industry \$750K

Memberships  
pooled to fund  
research

*Example: 10  
memberships @  
\$75K each =  
\$750K in  
research funding*

## NSF \$450K

for center  
operations

## Universities \$375K\*

By reducing  
overhead on  
average by 83%

\*calculation based on \$750K in total memberships

# Additional Membership Benefits

## Leveraged Research Dollars (in addition to NSF & university matching)



- Increased ROI when research is jointly funded by many companies
- Access other NSF funding opportunities for interns, undergraduate funding, grand challenge proposal inclusion and more

## Access to Research Results & IP



- One standard, simple IP agreement
- Influence project prioritization and selection via your votes and your priorities
- Opportunity to form relationships for joint technology development with other member companies and industry peers
- Gain royalty-free, non-exclusive licenses on intellectual property produced in center

## Access to Talent



- Hands-on Workforce Development
  - Students are the most effective “technology transfer”
  - Hire trained and tested graduate students for summer internships (low-cost risk mitigation) and for future full-time employment
- Gain early access to multi-university, cross-disciplinary research
- Collaborate with faculty and graduate students in various technical disciplines
- Participate in on-going research meetings, provide direction, give/get feedback



Thank you  
for your  
attention!