



## Energy Systems Innovation Center (ESIC) Update

### Fall 2021 ESIC REP Meeting

**Mani V. Venkatasubramanian**  
Director, ESIC



# WSU Power Program

- **Power Professorship program since 1973**
- **Energy Systems Innovation Center since 2012**
- **Educating leaders in industry**
- **Partnering with industry and government**
- **Significant & sustained impact**
- **Premier power program**



Image  
courtesy of



## Vision

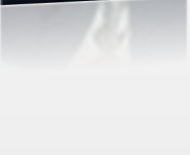
Leading the transition to  
affordable, sustainable and  
resilient electric power systems

## Mission

Collaborative research, education,  
and outreach to solve challenges  
for modern power systems



# ESIC Power Faculty



**Mani Venkatasubramanian**, Director, Boeing Distinguished Professor

**Anjan Bose**, Regents Professor, Distinguished Professor in Power Engineering

**Noel Schulz**, Schweitzer Endowed Professor

**Robert Olsen**, Professor Emeritus

**Saeed Lotfifard**, Associate Professor

**Anamika Dubey**, Assistant Professor

**Ahmed Abu-Hajar**, Clinical Associate Professor

**Javier Guerrero**, Clinical Assistant Professor

**Shuzeng Xie**, Clinical Assistant Professor

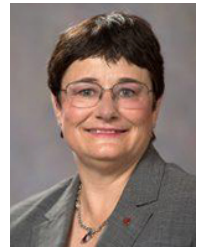
**Anurag Srivastava**, Research Professor

**Josue Campos Do Prado**, Assistant Professor

**Hang Gao**, Assistant Professor

**Henry Huang**, Research Professor

**Kevin Schneider**, Research Professor



## Electrical Engineering

- Sandip Roy – Dynamic Networks
- Pat Pedrow – High Voltage
- Hang Gao – WSU Vancouver
- Xinghui Zhao – WSU Vancouver

## Civil & Environmental

- Michael Wolcott – Sustainable Infrastructures
- Jennifer Adam – Water and Storage
- John Petrie – Impact of Hydro Operations
- Ji Yun Lee – Infrastructure resilience

## Chemical Engineering

- Su Ha – Fuel Cells

## Mechanical & Materials Engineering

- Jacob Leachman – Hydrogen/Nuclear
- Dustin McLarty – Energy Storage
- Grant Norton – Nanotechnology
- Soumik Banerjee – Solar Cells, Batteries
- Yuehe Lin – Batteries

## Computer Science

- Partha Pande – Network-on-Chip
- Behrooz Shirazi – Pervasive Computing
- Diane Cook – Smart Home/Environments
- Jana Doppa – Machine Learning
- Assefaw Gebremedhin – Data science
- Ananth Kalyanaraman – Computing

## Architecture

- Todd Beyreuther – Integrated Design

## Economics

- Alan Love – Electricity Markets

## Communication

- Amanda Boyd – Risk Communication

## Liberal Arts

- Paul Whitney – Cognitive Behavior
- Christine Horne – Social Norms

# ESIC Staff



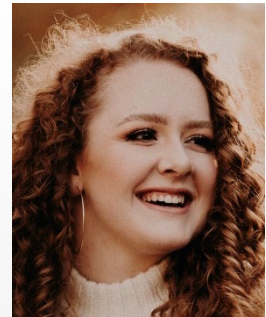
**Jeannine Burke – Manager**

**Linda Howell – Industry Relations  
Coordinator**



**Darlene Miller – Fiscal Assistant**

**Samantha Ulam – Communications  
Assistant**

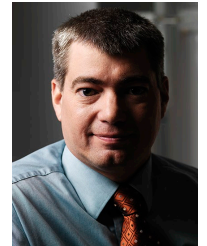


# New ESIC faculty

**Ongoing faculty search for three positions:  
(Assistant/Associate/Full Professor level)**

- **Power electronics**
- **Cybersecurity**
- **Power systems including AI/ML applications**

- **Dr. Noel Schulz elected to Washington State Academy of Sciences**
- **Dr. Anjan Bose received Cigre Medal**
- **Dr. Noel Schulz and Mr. Jeff Dagle appointed as AGI Co-Directors**
- **Dr. Kevin Schneider named PNNL Lab Fellow**
- **Dr. Anamika Dubey received VCEA Junior Faculty Research Award**
- **UI Assist project named key achievement of US-India energy partnership**
- **New \$1.5M DoD Cybersecurity Research and Teaching Institute (CySER) to be led by WSU.**





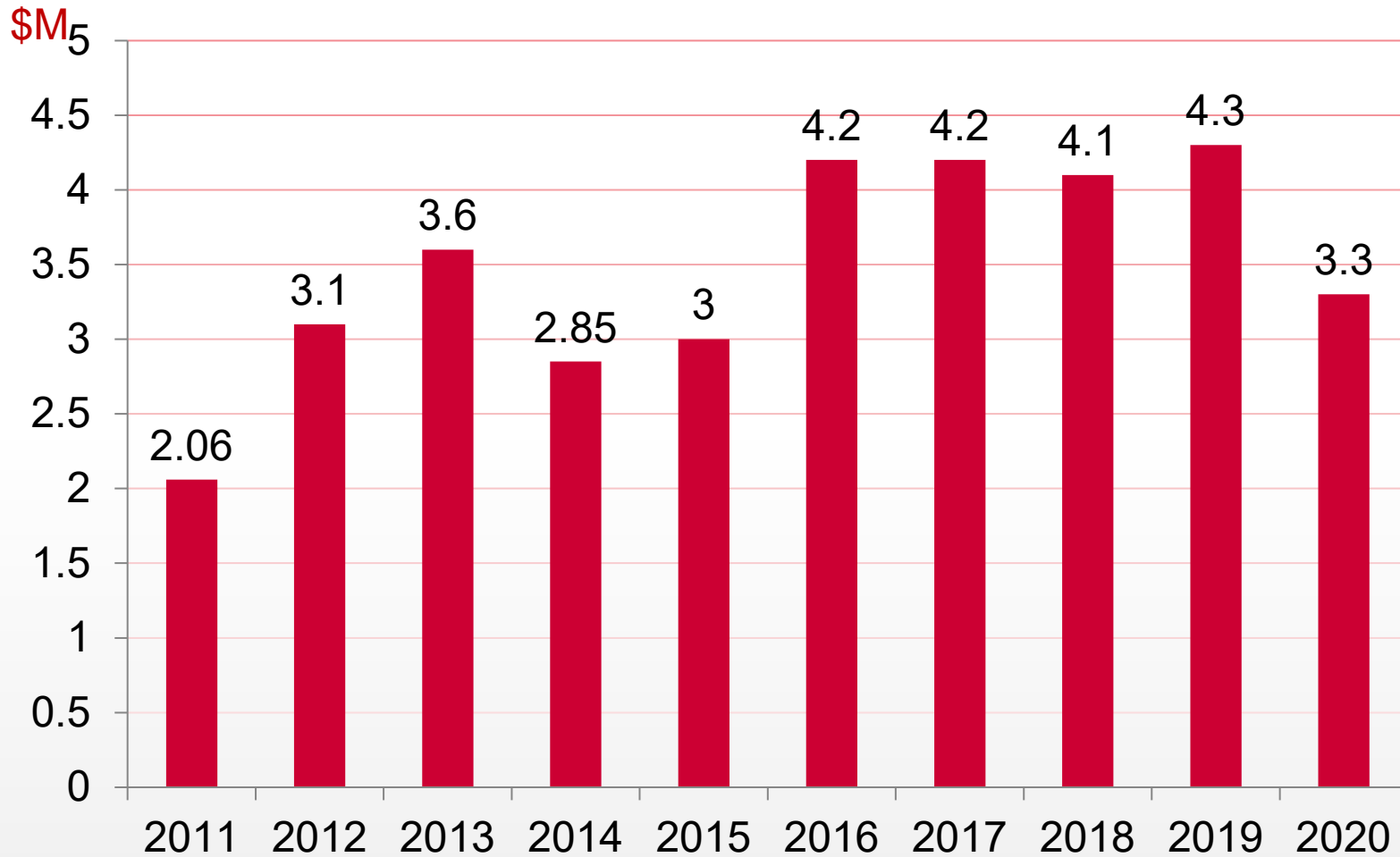
# Students 2020-2001

**Ph.D. Students: 30**

**M.S.: 2 (Thesis) + 3 (Non-Thesis)**

**Seniors taking power electives: 35**

# Research Expenditures



- 1) Microgrids and IBRs**
- 2) Reliability and Resilience**
- 3) Grid Edge/Privacy/Cybersecurity**
- 4) AI and ML Applications**
- 5) Workforce 2.0**

- **Technical conferences: WPRC, ESIC Summit, and Hands-on-relay school**
- **ESIC Seminars (weekly)**
- **ESIC Scholarships**
- **Leadership in professional societies**
- **Technology transfer – start-up companies and technology licensing**
- **Collaboration with centers, e.g. AGI, PSERC, CHARGE.**

# ESIC Memberships

- **ESIC Power Education Partnership (PEP)**
  - **Supporting power engineering education**
  
- **ESIC Research Excellence Partnership (REP)**
  - **Promoting research collaborations**

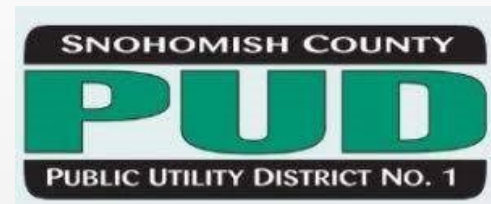
# ESIC REP Membership

- **ESIC Research Excellence Partnership (REP)**
- **Annual Membership: \$15K**
- **Benefits - Access to ESIC research:**
  - **Research collaborations**
  - **ESIC weekly seminars**
  - **Project catalog/announcements**
  - **Research reports and papers on secure website**
  - **Invitation to be project advisors**
  - **Tutorials by faculty experts**
  - **ESIC Summit**
  - **Dedicated industry liaison**
  - **Seed projects at no overhead (no deliverables)**

## ESIC REP Members 2020-21



Pacific Northwest  
NATIONAL LABORATORY



# ESIC PEP Membership

- **ESIC Power Education Partnership (PEP)**
- **Annual Membership: Varies**
- **Benefits – Support Power Engineering Education**
  - **Practicum (Planning meeting on November 3, 2021)**
  - **Support for Internships/Jobs**
  - **Power Curriculum Feedback**
  - **Free booths at Fall Career Expo and IEEE Career Fair**
  - **Professional Development Hours for ESIC weekly seminars**
  - **Optional Tutorials by Faculty Experts**
  - **Dedicated Industry Liaison**



## ESIC PEP Members 2020-21



## Support for Power Engineering Education

- **Travel support for Practicum**
- **Power teaching lab support**
- **Student travel support for attending power conferences and for field trips**
- **ESIC PEP Scholarships**

## Professional Science Masters (PSM) in Electrical Power Engineering (EPE)

- **Online degree program offered by ESIC**
- **Combination of Electrical Engineering and Engineering Management courses**
- **Students from all over the world**

- **Excellence in fundamentals of power engineering**
- **Mentoring, face to face**
- **Understanding of present and future of power engineering**
- **Forward looking curriculum for the future industry environment**
- **Hands-on-training in lab courses**
- **Leadership, teamwork, and project management skills**
- **Experience from Internships/Practicum**
- **Strong industry engagement in senior design projects**



# ESIC Power Curriculum Plans

- **Pullman, Everett and Bremerton – consistency among the three programs**
- **All power lecture courses to be shared among the three campuses**
- **Access to similar teaching labs at all three campuses –  
New lab resources needed for Bremerton and Everett**

# ESIC Lab Support

- **Machines Labs: \$600K: \$400K ESIC, \$200K EECS: Pullman (2019), Bremerton (2019), Everett (2019)**
- **Protection Labs: State-of-the-art lab in Pullman, Bremerton and Everett – in plans**
- **PSE Renewables Lab – Pullman (2010)**
- **Power Electronics Lab – Pullman, Everett, Bremerton – in plans**