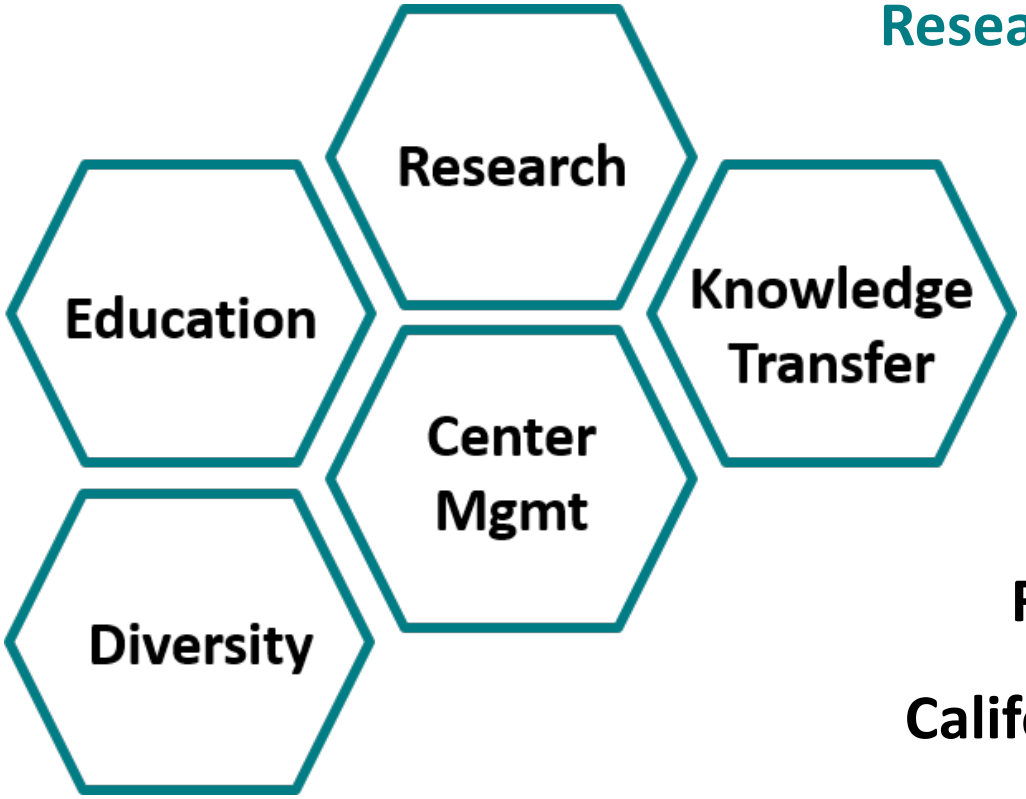
Center Management

Michael H. Bartl

Executive Director

Center for Energy Efficient Electronics Science

E³S – At a Glance



Research & Education Partners

UC Berkeley

MIT

Stanford

UT El Paso

Florida International U

California Community Colleges

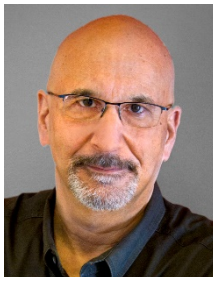
Industry Partners

Applied Materials, HP Enterprise, IBM, Intel, Lam Research

Administrative Team

Eli Yablonovitch
Center Director

Michael Bartl
Executive Director



Jeffrey Bokor
Deputy Director

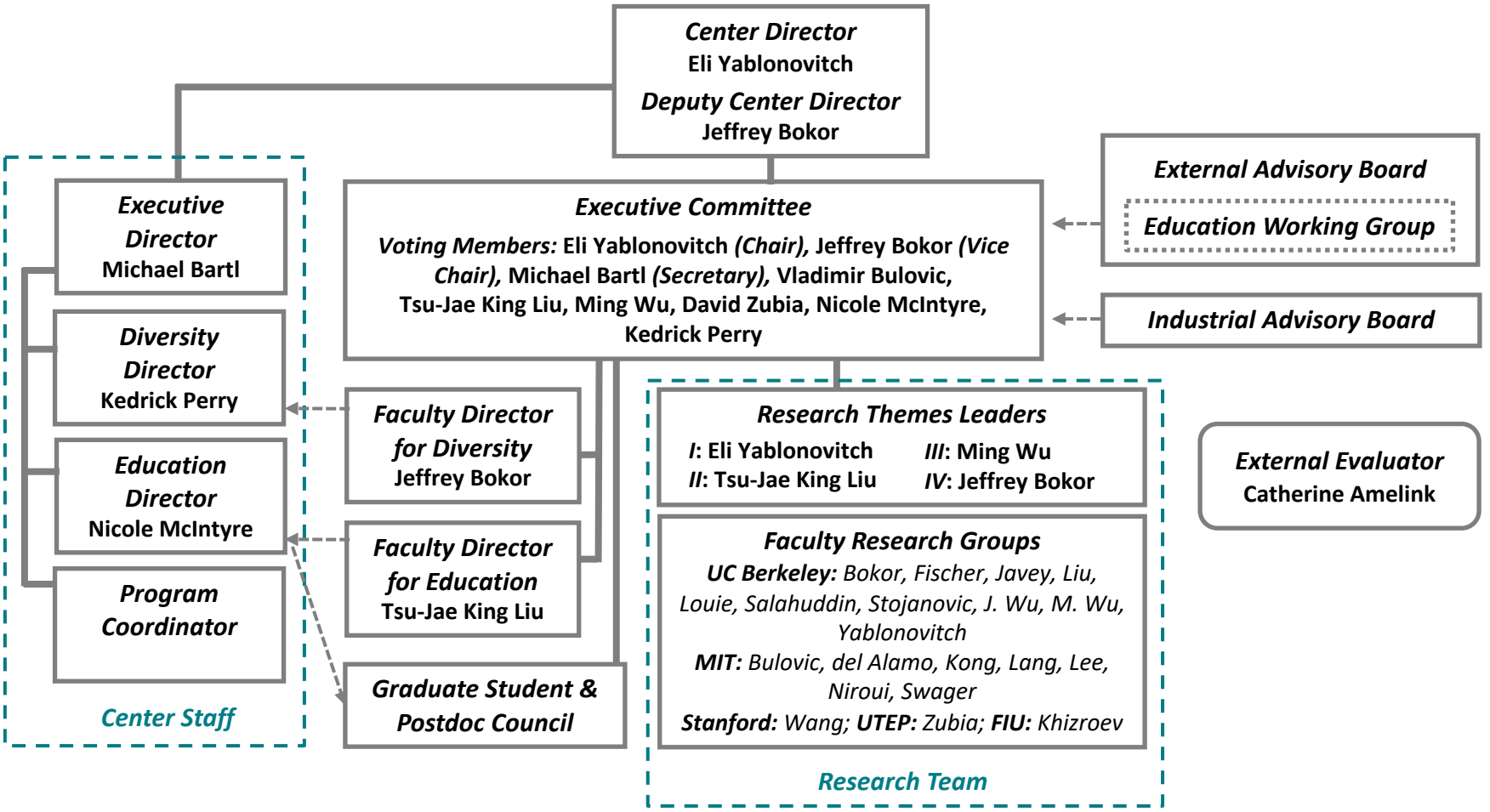
Kedrick Perry
Director of Diversity

Nicole McIntyre
Assoc. Director of Education

Charlotte Jones
Admin. Assistant

Catherine Amelink
External Evaluator

E³S Organizational Chart

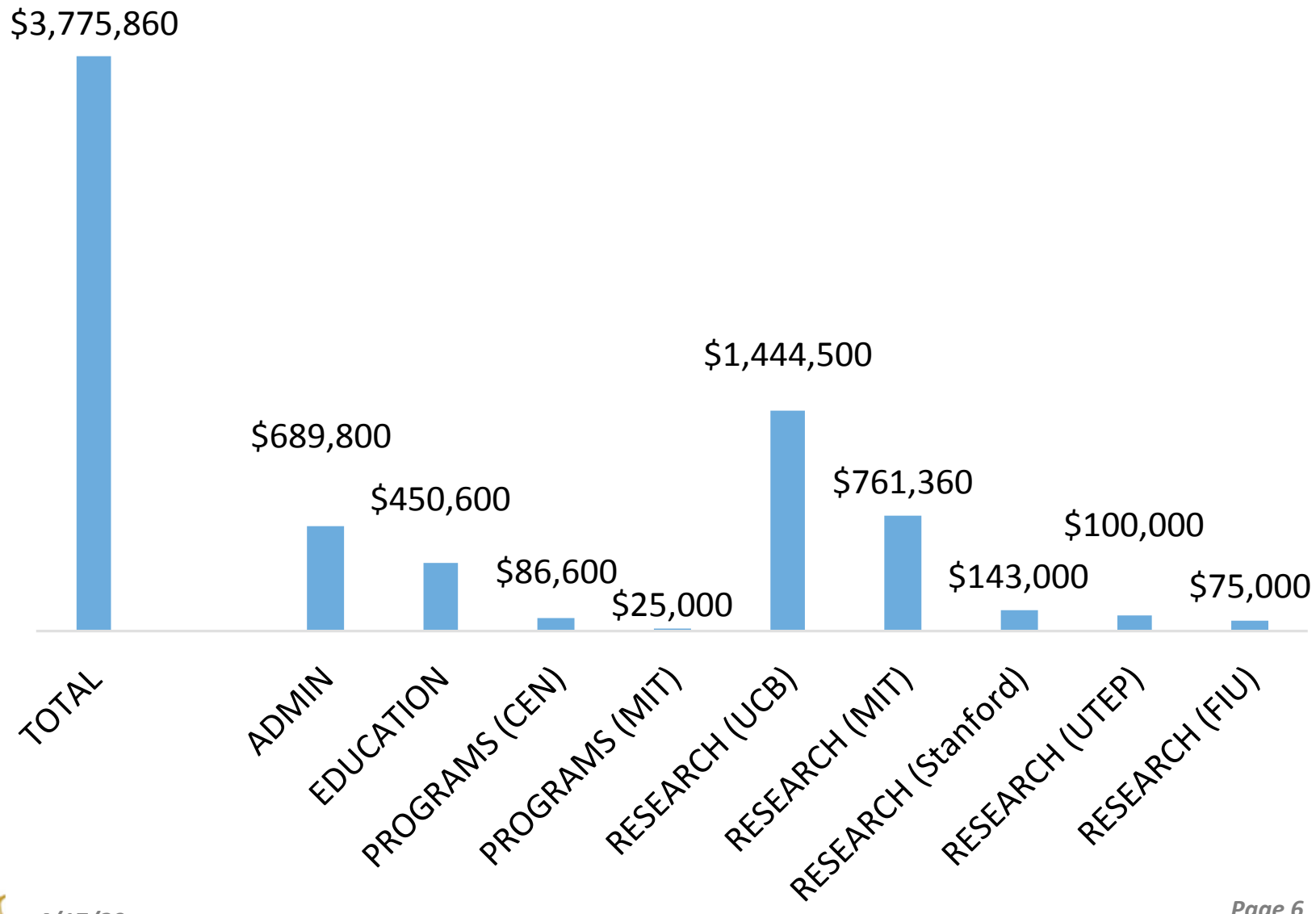


Annual Survey on Center Leadership
Students/Postdocs and Faculty

	Students/PDs	Faculty
Inclusiveness	4.5	4.8
Teamwork/Collaboration	4.3	4.8
Open and timely communications	4.5	4.8
Agility/Decision Making	4.4	4.8
Focus on Performance	4.2	4.7
Sample size	*24*	*18*

Likert Scale: *5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree*

Center Budget for Period 10 (3/2019—2/2020)



Multi-Institutional Programs

- **Graduate Student & Postdoc Rotation Program**
  - 1 participant this year: Ingrid Torres (FIU)
  - Plan to continue in final period

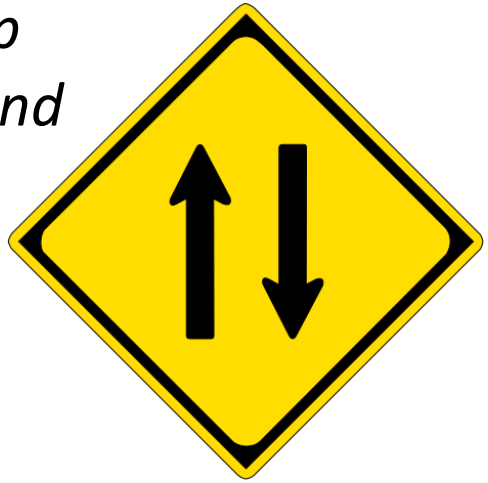
- **Inter-Institutional Postdoc Program**
  - One inter-institutional postdoc per Theme
  - Must stay in at least two different E^3S institution
  - Funded by Center reserves

  This program has ended in period 9.

- **Impact of Programs**
  - Multi-institutional projects: 30% → 70%
  - Multi-institutional publications: 1-2 → 5-7

Knowledge Transfer at E^{3}S: A Two-Way Street

The goal of the Center for E^{3}S, is to both develop novel, highly efficient electronic technologies, and engage stakeholders of various science and engineering disciplines and at different educational levels to participate in these new opportunities.



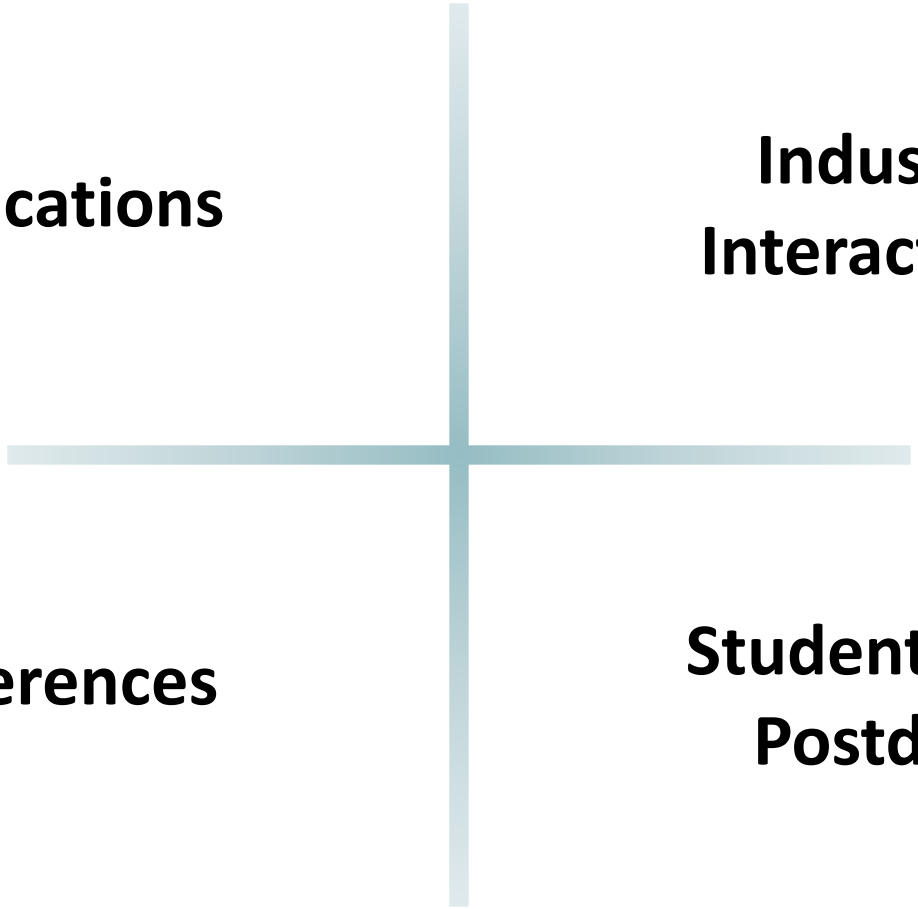
At E^{3}S knowledge transfer happens at two levels:

1) Knowledge transfer within the Center's main partners as a cross-fertilization of ideas and projects.
2) Knowledge transfer throughout the technology and education ecosystem in which the Center participates.

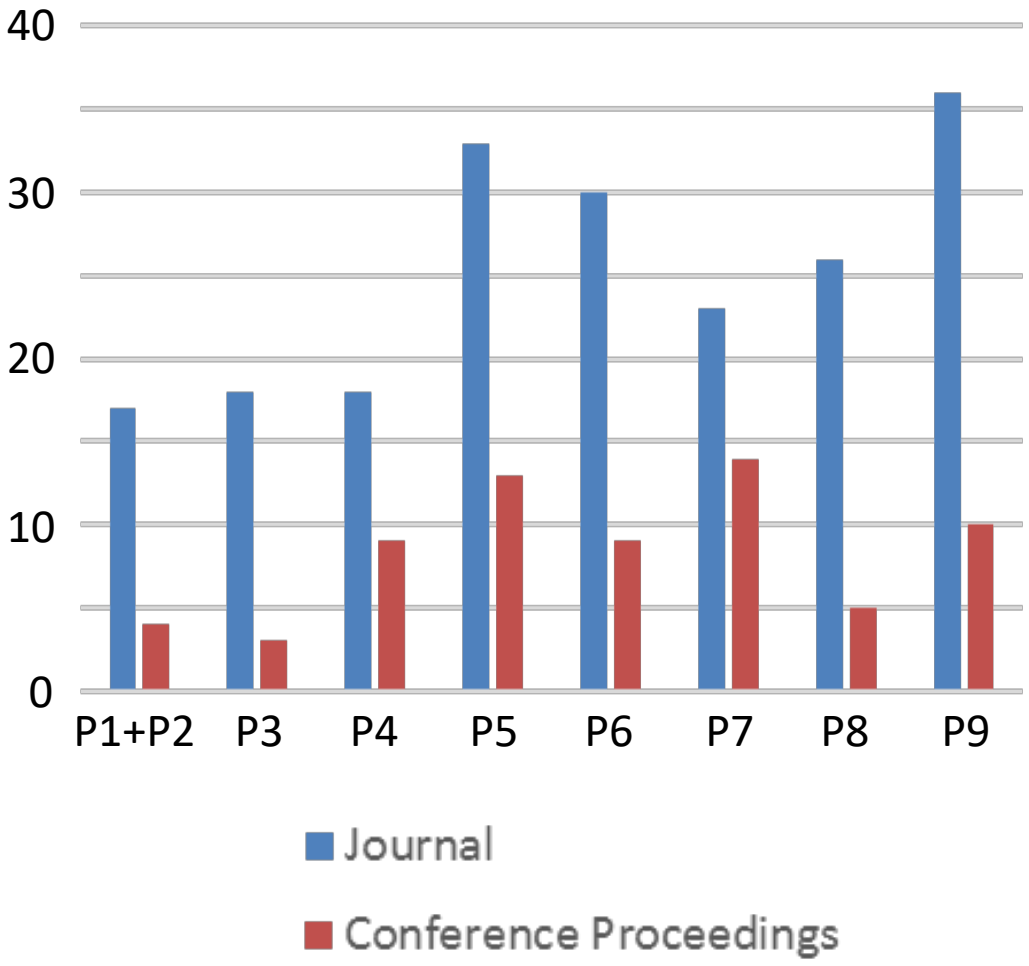
"Spinoff" Applications

E^3S Research Outcomes	"Secondary" Use	Interested Parties
Negative Capacitance in Ferroelectric Materials	Low-power memory	Industry-funded Center at UC Berkeley
RIE Process with Digital Etch Technology for III-V Features of High Aspect Ratios	Demonstrated the potential of III-V MOSFETs for future CMOS	Defense Threat Reduction Agency Semiconductor companies
Squitch Switches	Analog Valves	MIT Lincoln Lab
Nanostructured Phase Transition in VO_2	Multifunctional Thermal Switch	Samsung
Process for Developing Sub-Lithographic Features	Broad processing applications	Applied Materials, Axcelis, Lam
2D Chalcogenide Materials	Characterization of graphene and MoS2	Applied Materials
Nanoparticle-based magnetic tunneling junctions	Magnetoelectric Nanoparticles for Batteries	Turning Point Brands

Main Areas of Knowledge Transfer at E^{3}S



Publications



Period 9:

Total: 46

Multi-PI: 20

Multi-Inst.: 7

Patents/Appl.: 3

Cumulative:

Papers: 273

Multi-PI: 103

Multi-Inst.: 20

External Citations: 6076

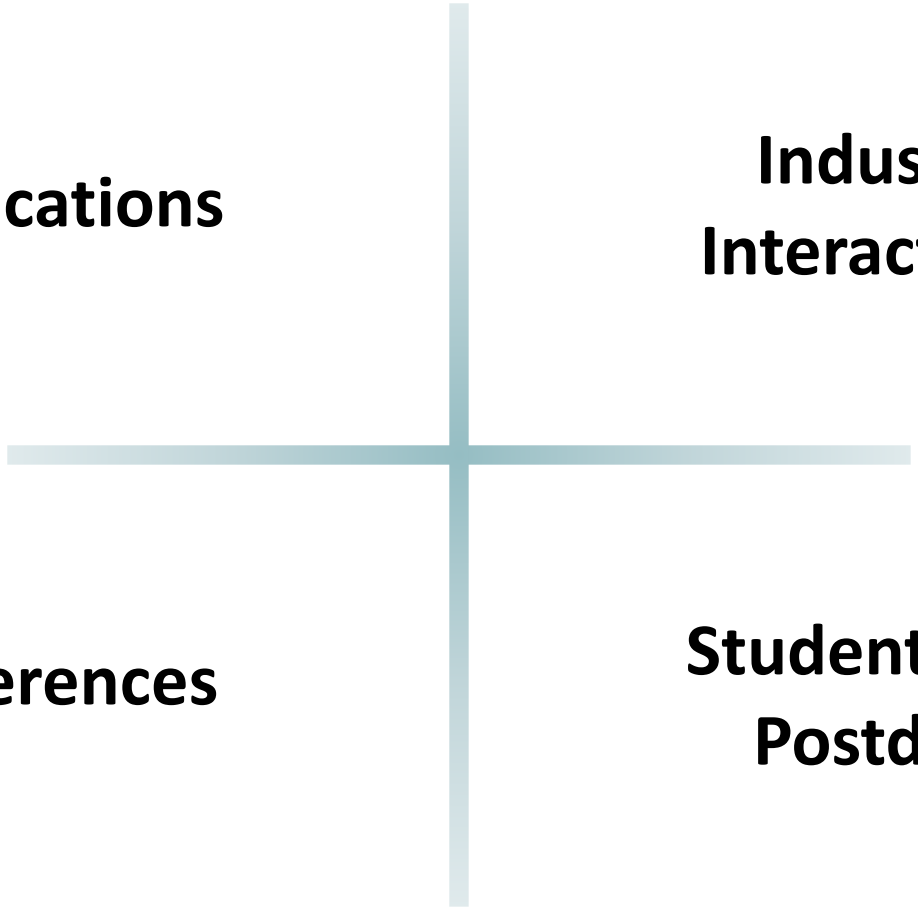
Patents/Appl.: 34

E³S Data Management Plan: *Publications*

The smallest common denominator across all major publishers is that authors are allowed to post their submitted manuscript on their/institutional websites.

E3S staff has started to work with Center investigators in preparing and posting submitted manuscript versions, including *a cover page with explanation/disclaimer, required publisher information, and link to request published version of manuscript.*

Main Areas of Knowledge Transfer at E^{3}S



Students and Postdocs

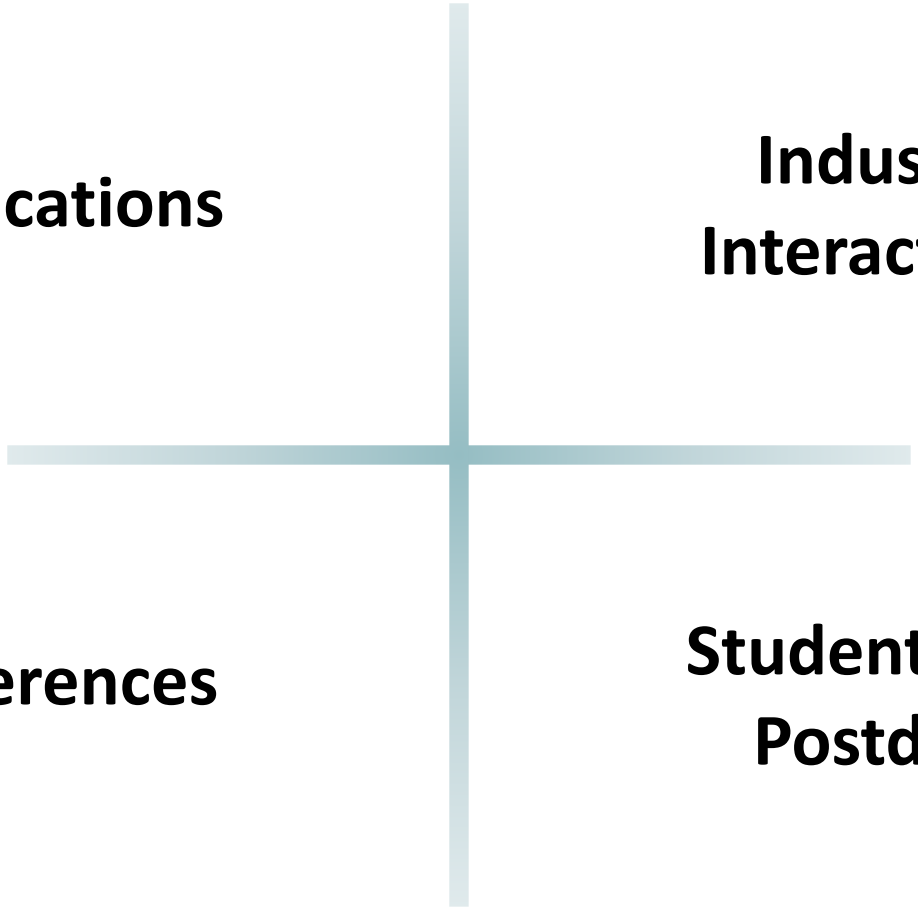
"Make them the best possible ambassadors for our Center"

- **Education and Diversity Team**
  - Leadership Certificate Program
  - Graduate Student & Postdoc Council
  - Poster sessions with industry partners

- **Where do they go?**
  - Transfer to Industry: 4 students, 3 PDs
  - Transfer to Academia: 7 students, 2 PDs

- **Record Number of Student and Postdoc Fellowships**
  - NSDEG, NSF GRF, NSERC (Canada), UC Presidential Fellow, GEM Fellow
  - >$300k in support

Main Areas of Knowledge Transfer at E^{3}S



Berkeley Symposium on Energy Efficient Electronic Systems & Steep Transistors Workshop

Now part of the IEEE S3S Conference!

Planned: E3S ”Closing” Symposium

- 10 years of NSF funding for the Center for E3S will officially end on August 31, 2020
- We plan to organize a closing event (E3S Symposium)
- Current & past E3S participants, industry partners, external advisory board members, NSF program directors (Usha Varshney, Dragana Brzakovic)

Knowledge Transfer

Publications

Cumulative: 273

Period 9: 46

Multi-PI: 20

Multi-institutional: 7

Industry Interactions

Applied Materials, HPE, IBM, Intel, Lam Research

"Spin-off" applications

Conferences

Berkeley Symposium on Energy Efficient Electronics

E3S Symposium (planned)

Students and Postdocs

Transfer to Industry:

- 4 students, 3 PDs

Transfer to Academia:

- 7 students, 2 PDs