

Education and Diversity

Kedrick Perry, Director for Diversity
Lea Marlor, Associate Director for
Education



A Science & Technology Center

Berkeley
UNIVERSITY OF CALIFORNIA

Massachusetts
Institute of
Technology

STANFORD
UNIVERSITY

THE UNIVERSITY OF
TEXAS AT EL PASO

FLORIDA
INTERNATIONAL
UNIVERSITY

CALIFORNIA COMMUNITY COLLEGES
CHANCELLOR'S OFFICE

Center for Energy Efficient
Electronics Science



Education and Diversity Goals

- Professional and Leadership Development
- Community College/ Undergraduates/ Graduates/ Postdocs
- Broadening Participation



General Public and High School Education and Diversity Efforts



Public Outreach

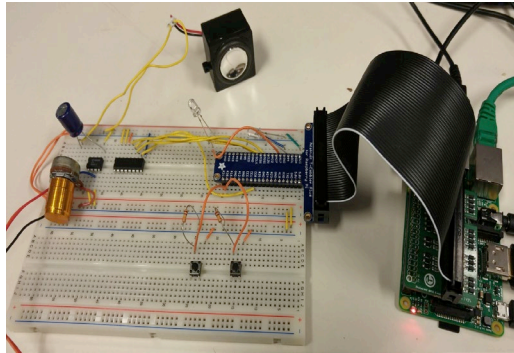
- Science Festivals and Fairs
- Lab Tours
- K-12
- Social Media

Approximate number reached >1700 people

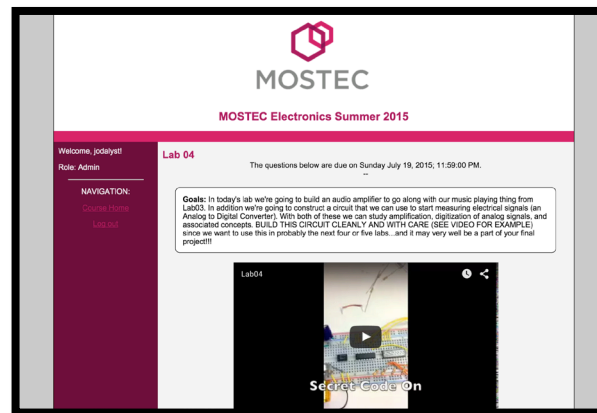


MIT Online Science, Technology, and Engineering Community

48% of pre-college program alumni in STEM bachelor programs



Online Project



Online Seminars

2017 Cohort:

- 100% (43) from underrepresented groups



College Prep Conference



Electronics Design Workshop



Clean Room Tours



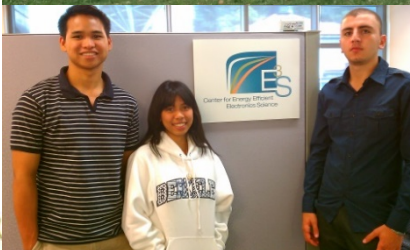
Undergraduate Education and Diversity Efforts





Transfer-to-Excellence Program

Created a National Model of Student Transfer Success



California transfer rate: 40%

Nationwide transfer rate: 67%

**TTE transfer rate: 93% (66) of eligible students,
E³S students- 93% (28)**

- 88% (58) enrolled at a UC campus, E³S students- 89% (25)
 - 61% (40) enrolled at Berkeley, E³S students- 75% (21)
- 86% (74) from underrepresented groups, E³S students- 89% (32)

External NSF Site Grants: EEC 1157089, EEC 1461157

American Association of Community Colleges (AACC). (2012a, April)., Reclaiming the American Dream: A report from the 21st-Century Commission on the Future of Community Colleges., Washington, DC: Author. <http://datamart.cccco.edu>

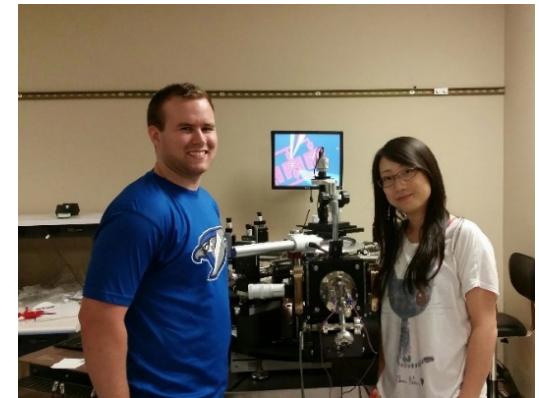


Empowering Community College Faculty



Research Experience for Undergraduates (E³S REU)

- 9-week summer residential program that offers undergraduates (engineering or physical science majors) the opportunity to conduct research in the laboratories of E³S faculty
 - ❑ 73% of our graduates are in STEM graduate programs
 - ❑ 63% of our graduates are underrepresented

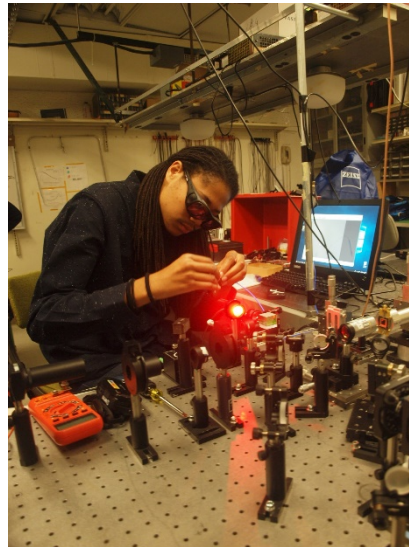
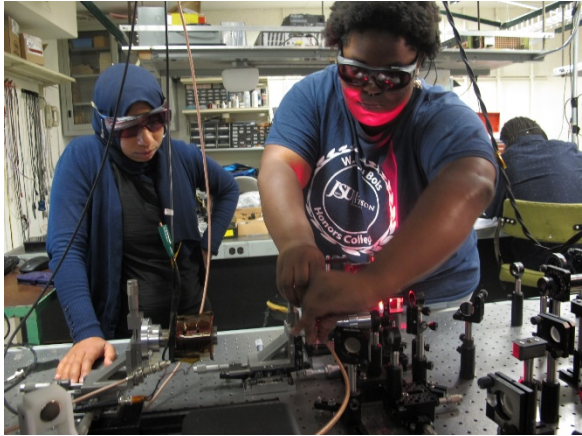


UC Berkeley – Historically Black Colleges and Universities Research Experiences for Undergraduates

- Geared for sophomore students
- Continued research projects at their home institutions
- Eligible for second summer with E³S REU
- Funded through UC-Office of the President



HBCU REU 2018



HBCU and E3S REU 2018



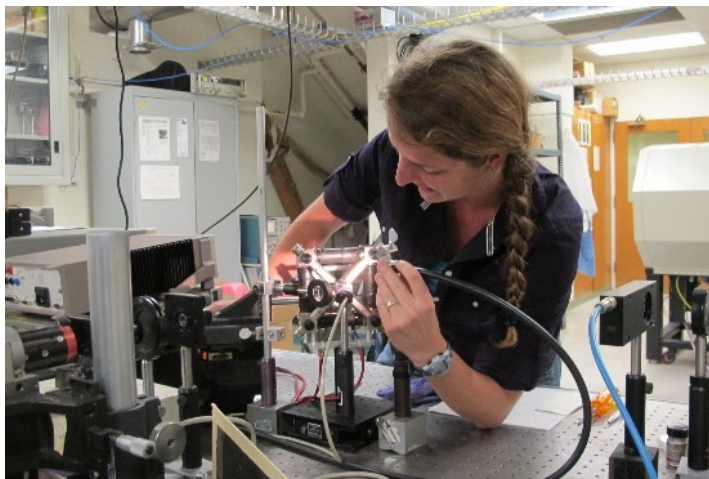
Page 12

E³S Internship Program (ETERN)

- A paid research internship program, enabling undergraduates of E³S institutions to undertake research with E³S faculty

Provides:

- 10-weeks of research experience; average 10 hours per week
- Hands-on research guided by faculty advisors and graduate student mentors
- Stipend

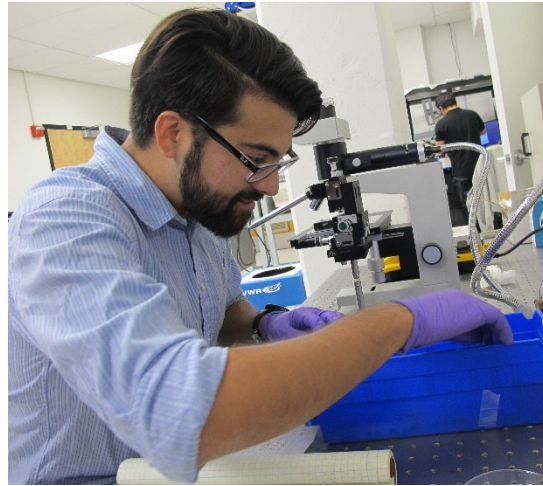
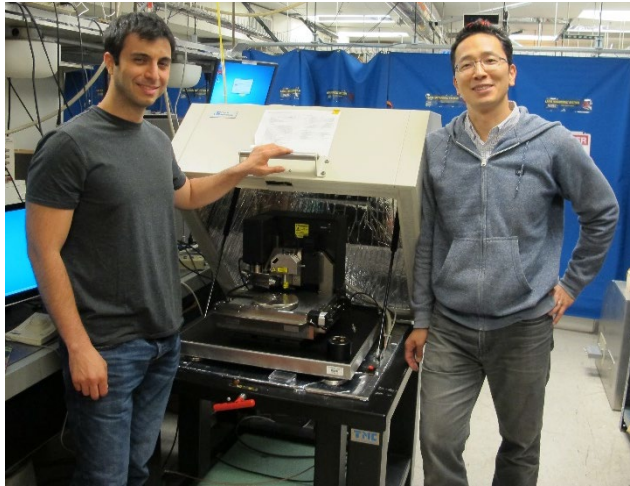


Graduate Student and Postdoc Education and Diversity Efforts



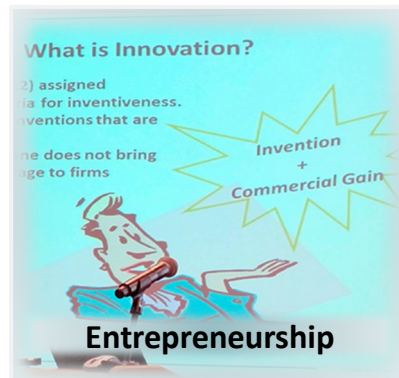
Graduate and Postdoc Education

- Leadership Program
- Graduate Students and Postdocs are helping to create the E³S legacy
- Rotation Program
- Postdoc Program



E³S Leadership Certificate

Certificate Modules



| THE NATIONAL SCIENCE FOUNDATION | | |
|---|---|-------------------|
| FOR NSF USE ONLY | | |
| NSF PROPOSAL NUMBER | | |
| 1157089 | | |
| FUND CODE | DUNS# (Data Universal Numbering System) | FILE LOCATION |
| 1360 | 124726725 | 09/24/2011 7:02pm |
| IS THIS IS | IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S) | |
| NO RENEWAL | | |
| NAME OF Awardee Organization, including 9 digit ZIP CODE | | |
| University of California-Berkeley | | |
| Sponsored Projects Office | | |
| Berkeley, CA. 947045940 | | |
| ADDRESS OF PRIMARY PLACE OF PERF., INCLUDING 9 DIGIT ZIP CODE | | |
| University of California-Berkeley | | |
| State | | |
| City | | |
| Proposal Writing | | |
| <input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL | | |

24
Certificates
awarded
60%
started
training in at least
one area



Education Legacy



A Science & Technology Center



Center for Energy Efficient
Electronics Science

Education Legacy in 2020

- **E³S is creating resources that will live on, past the center**
 - ❑ **Online Videos**
 - ❑ **Nanohub**
 - ❑ **E-Book**



E³S Legacy – An Electronic Book

OBJECTIVE

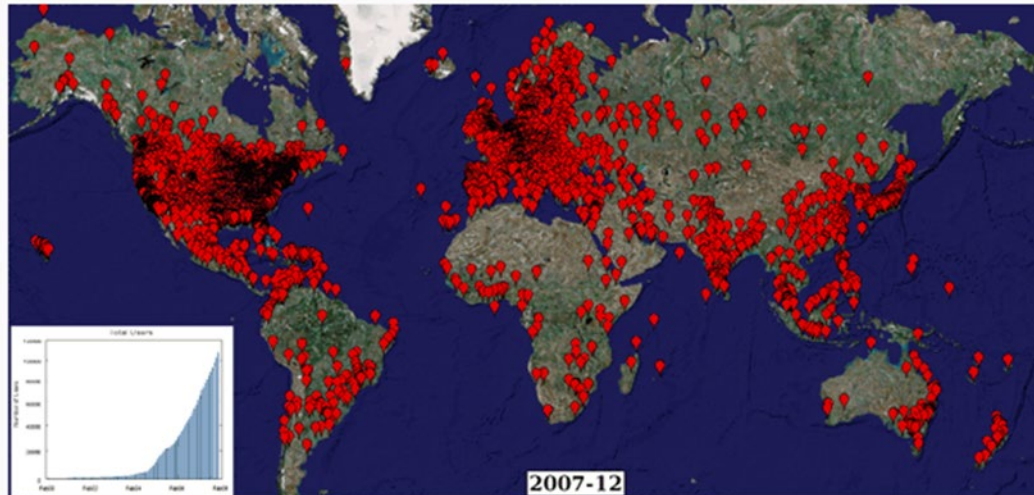
Develop a comprehensive educational resource
on energy efficient electronics including
**nanoelectronics, nanomechanics,
nanophotonics, nanomagnetics**
to motivate **high school students** to pursue
academic studies and careers in the **STEM fields**



Platforms for eBook - NanoHUB

Online Portal for Nanotechnology Education
Created by Purdue University and NSF

Our mission is to support and grow the nanotechnology community and to generate new modes of discovery, innovation, learning, and enagement in the field.




E³S NanoHUB

<https://nanohub.org/groups/e3s>

(Currently not public)

Energy Efficient Electronics Science

DISCOVERABILITY: HIDDEN JOIN POLICY: CLOSED CREATED: 26 MAY 2016



Group Manager

- Overview
- Members
- Announcements
- Blog
- Calendar
- Collections
- Forum



Overview


ABOUT THE GROUP


The Center for Energy Efficient Electronics Science (E³S) supported by the National Science Foundation (NSF) combines a broad research and education approach to advance two major fundamental components of digital information processing systems: the communications logic switch and the short-medium range communication of information between logic elements. Four fundamental research areas are explored within this center namely Nanoelectronics, Nanomechanics, Nanomagnetism, and Nanophotonics.


GROUP MEMBERS


View All Members →

 Farnaz Niroui

 Tsu-Jae King Liu

 Michael H. Bartl

 Kedrick Perry

 Center for E3S



Tasks and Timeline

| | | |
|----------------|-----------|-------------------------|
| Outline | Sept 2016 | Email, WebEx Discussion |
| Assign Authors | Sept 2017 | Email, WebEx Discussion |



Theme II – Nanomechanics Outline

| Chapter | Title | Assigned Authors |
|---------|--|-------------------------------|
| 0 | Energy-Efficiency Limit of Digital Computing | T. King Liu |
| 1 | Introduction to MEMS/NEMS | J. Lang |
| 2 | Fabrication of Micro/Nano Systems | M. Sara., J. Patil, F. Niroui |
| 3 | Electromechanical Actuators | J. Han, A. Ye |
| 4 | Logic Relay Design | U. Sikder, S. Almeida |
| 5 | Reliability Limits of N/MEM Relays | B. Osoba, T. King Liu |
| 6 | Adhesion in NEM Switch | B. Saha, J. Wu |
| 7 | Tunneling NEM Switches – Squitches | F. Niroui |
| 8 | The STRITCH-Switch Device | A. Almeida, D. Zubia |
| 9 | Relay-based Integrated Circuits | R. Naous, V. Stojanovic |
| 10 | Conclusions and Outlook | |



Tasks and Timeline

| | | |
|-------------------|---------------|---------------------------|
| Outline | Sept 2016 | Email, WebEx Discussion |
| Assign Authors | Sept 2017 | Email, WebEx Discussion |
| Write First Draft | February 2018 | MS Word Template, Dropbox |



Template

To keep formatting
consistent

CHAPTER #: CHAPTER TITLE

Authors: List the name of the authors for this chapter.

Affiliations: List the authors' affiliations here.

"Section #: Section Title"

Include here the main body of this section. Follow the instructions below for including subsections, figures, equations and references. A brief example is provided on the next page.

[[Image(1-1.png, desc= "This is the caption for image 1.1 for Chapter 1")]]

"Subsection #: Subsection Title"

Include here the main body of this subsection.

"References"

[1] J. O. Lee, Y. Song, M. Kim, M. Kang, J. Oh, H. Yang, J. Yoon, "A sub-1-volt nanoelectromechanical switching device", Nat. Nanotechnol., vol. 8, pp. 36-40, 2013.

Instructions for including figures, tables, equations and references:

Example Section numbering for Chapter 1: 1.1, 1.2, 1.3, etc

Example Subsection numbering for Chapter 1: 1.1.1, 1.1.2, 1.2.1, 1.2.2, etc

Including figures: Do not include the figures in the main body of the text. Instead type `[[Image(Image#.png, desc= "Caption here")]]` as a place holder. Upload your images separately to the corresponding dropbox folder. Use the following naming convention for the image files: Image#.png (note: For image number use "Chapter number-Image index", for example the second figure in Chapter 1 will be 1-2)

Including Equations: Save equations as image files and follow the same steps as explained above to include the equations in the document. Equations should be in "Cambria Math" font. (If you do not have access to this font let me know)

Including Tables: Save tables as image files and follow the same steps as explained above for the figures to include the tables in the document. Tables should be in "Arial" font.

Including References: Use IEEE referencing style. An example is shown above.

Font Styles: Follow the following formatting to include special font styles.

Instead of **bold** include `"bold"`

Instead of *italic* include `"italic"`


















































































Instead of ^{superscript} include `^superscript^`

Instead of _{subscript} include `_,subscript,`



Dropbox

To share/compile files

| | | | | | | | | | |
|--|---|---|---|--|---|---|---|--|--|
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| | | |  Chapter 1 |  |  |  0-2.png |  | | |
| | | |  Chapter 2 |  |  |  0-3.png |  | | |
| | | |  Chapter 3 |  |  |  0-4.png |  | | |
| | | |  Chapter 4 |  |  |  0-5.png |  | | |
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| | | |  Chapter 8 |  |  |  0-9.png |  | | |
| | | |  Chapter 9 |  |  |  0-10.png |  | | |
| | | |  Chapter 10 |  |  |  0-11.png |  | | |
| | | |  Compiled |  |  |  0-12.png |  | | |
| | | |  Final Copies |  |  |  Chapter 0...II Manuscript |  | | |
| | | |  Revision Comments |  |  |  Chapter 0...nuscript.pdf |  | | |
| | | |  Template |  | |  Chapter 0.docx |  | | |
| | | | | | |  Eqn0-1.png |  | | |
| | | | | | |  Eqn0-2.png |  | | |



Theme II – Assign Reviewers

| Chapter | Assigned Authors | Assigned Reviewers |
|---------|-------------------------------|--------------------|
| 0 | T. King Liu | A. Vidana |
| 1 | J. Lang | T. Esatu |
| 2 | M. Sara., J. Patil, F. Niroui | S. Almeida |
| 3 | J. Han, A. Ye | D. Zubia |
| 4 | U. Sikder, S. Almeida | R. Naous |
| 5 | B. Osoba, T. King Liu | J. Lang |
| 6 | B. Saha, J. Wu | F. Niroui |
| 7 | F. Niroui | J. Han |
| 8 | A. Vidana, D. Zubia | J. Wu |
| 9 | R. Naous, V. Stojanovic | A. Ye |



Tasks and Timeline

| | | |
|-------------------|---------------|---------------------------|
| Outline | Sept 2016 | Email, WebEx Discussion |
| Assign Authors | Sept 2017 | Email, WebEx Discussion |
| Write First Draft | February 2018 | MS Word Template, Dropbox |
| Internal Review | March 2018 | MS Word, Dropbox |
| Revise Drafts | July 2018 | MS Word, Dropbox |
| External Review | Sept 2018 | PDF |

High School Students and Teachers



Tasks and Timeline

| | | |
|-------------------|---------------|---------------------------|
| Outline | Sept 2016 | Email, WebEx Discussion |
| Assign Authors | Sept 2017 | Email, WebEx Discussion |
| Write First Draft | February 2018 | MS Word Template, Dropbox |
| Internal Review | March 2018 | MS Word, Dropbox |
| Revise Drafts | July 2018 | MS Word, Dropbox |
| External Review | Sept 2018 | PDF |
| Revise Drafts | Sept 2018 | Word, Dropbox |

Finalize formatting

**Outline to Revised Drafts
about 1 year**

Upload

