Speakers

Chantal Stieber, Cal Poly Pomona
Building a Research Program to Target Pollutant Reduction: From Small Internal Grants to an NSF CAREER Award and a Brighter Future

Cheryl Van Buskirk, CSUN
A CURE for Disordered Sleep

Kimberly Blisniuk, San Jose State University
A Geologic Perspective on Assessing Seismic Risk in California, and How my CAREER Grant Relates to it

Blake Riggs, San Francisco State University
Asymmetric ER Partitioning as a Pathway for Cell Fate Specification

Geoffrey Lovelace, Cal State Fullerton
Computational Gravitational-Wave Physics and Astronomy at California State University, Fullerton

Matthew Povich, Cal Poly Pomona
BUILD: Bringing the Universe to Inland Empire and Los Angeles Districts

Nina Robson, Cal State Fullerton
Research Highlights Since Receipt of the NSF CAREER Award
Building a Research Program to Target Pollutant Reduction: From Small Internal Grants to an NSF CAREER Award and a Brighter Future

S. Chantal E. Stieber – Cal Poly Pomona

S. Chantal E. Stieber, Associate Professor
Cal Poly Pomona, Department of Chemistry & Biochemistry
sestieber@cpp.edu

CAREER: Quantifying Nitrogen-Oxide (NO) Activation and Coordination Modes through Synthesis, Spectroscopy and Computations
**Project Overview**

- **Aim 1.** Develop X-ray emission spectroscopy (XES) to characterize metal-NO\(_x\) species
- **Aim 2.** Advance knowledge of XES through computational methods
- **Aim 3.** Synthesize new metal complexes bound to NO\(_x\) to establish spectral trends
- **Aim 4.** Introduce computational inorganic research in the classroom
- **Aim 5.** Implement hands-on crystallography in education

---

**CAREER: Quantifying Nitrogen-Oxide (NO) Activation and Coordination Modes through Synthesis, Spectroscopy and Computations**

S. Chantal E. Stieber  
Cal Poly Pomona/Chemistry & Biochemistry  
sestieber@cpp.edu
Leveraging Grants

- Many internal funding opportunities
  - RSCA, SPICE, Teacher-Scholar, Exceptional Service, student fellowships
- CSU-level funding
  - CSUPERB
- External funding
  - Off-site experiments at Stanford Synchrotron Radiation Lightsource
  - NSF XSEDE computational resources
  - Applied to NSF RUI, NSF CAREER, ACS PRF
  - Received DoD instrumentation grant for single crystal X-ray diffractometer, $600,000

S. Chantal E. Stieber  Cal Poly Pomona/Chemistry & Biochemistry  sestieber@cpp.edu

CAREER: Quantifying Nitrogen-Oxide (NO) Activation and Coordination Modes through Synthesis, Spectroscopy and Computations
Year 1 Progress

- Trained 15 undergraduates and 3 Master's students
- Publications
  - 3rd publication submitted—has since been accepted
- Created new course in crystallography, 3 videos
- Data collection at Stanford Synchrotron Radiation Lightsource
- 17 presentations by students at 3 conferences

CAREER: Quantifying Nitrogen-Oxide (NO) Activation and Coordination Modes through Synthesis, Spectroscopy and Computations

S. Chantal E. Stieber  Cal Poly Pomona/Chemistry & Biochemistry  sestieber@cpp.edu
Serving on CAREER panel

• Most proposals are excellent!
• Pretty and easy to read/view proposals fare better
• Figures help
• Reiterate important components
• Be specific
• Preliminary results are key!
• Well thought out teaching plan/broader impacts
• Established collaborations
• Really focus on feasibility for PUIs

S. Chantal E. Stieber  
Cal Poly Pomona/Chemistry & Biochemistry  
sestieber@cpp.edu

CAREER: Quantifying Nitrogen-Oxide (NO) Activation and Coordination Modes through Synthesis, Spectroscopy and Computations

Figure 10: In-house crystal structure by 3rd year UG and synthesis of Ni-NO complex.
Building a CAREER

- Funding begets more funding
  - Matching funds for internal opportunities
  - ARI grant: “Iron and nickel catalysts for mitigating denitrification and agricultural pollution” $83,452

- Center grant
- Instrumentation grants
- International collaborations and sabbatical
  - Master’s student DAAD funding to do research in Germany

CAREER: Quantifying Nitrogen-Oxide (NO) Activation and Coordination Modes through Synthesis, Spectroscopy and Computations

S. Chantal E. Stieber  Cal Poly Pomona/Chemistry & Biochemistry  sestieber@cpp.edu
Summary

• Preliminary results are key!
• Reiterate important components
• Really focus on feasibility for PUIs
• Build collaborations

CAREER: Quantifying Nitrogen-Oxide (NO) Activation and Coordination Modes through Synthesis, Spectroscopy and Computations

Welcome to the website for the Stieber Lab!
We are operating remotely for the time being, but are actively working on research. Feel free to contact us with questions or for collaborations. Stay safe everyone!

@Stieberlab

https://www.cpp.edu/~sestieber

S. Chantal E. Stieber  Cal Poly Pomona/Chemistry & Biochemistry  sestieber@cpp.edu
A CURE for disordered sleep

Cheryl Van Buskirk, California State University Northridge

and

Students of BIOL447/L FIRE: Full Immersion Research Experience

Cheryl Van Buskirk, Associate Professor
CSUN, Department of Biology
cheryl.vanbuskirk@csun.edu
Project Overview

• There is STILL debate about the core function of sleep

• Sleep is regulated by two main inputs, circadian & homeostatic

• To better understand sleep need, remove influence of circadian regulation!
Project Overview

*C. elegans* sleeps…

1. during development
2. following cellular stress
   (not just hurt - sleeping!)

Goal: identify genetic components of stress-induced sleep (SIS)

Cheryl Van Buskirk
CSUN Biology
cheryl.vanbuskirk@csun.edu
NSF-CAREER: Integrate Research & Education

The proposal:

2/3 research component
- includes references to educational component

1/3 education component
- includes assessment plan

Both components have preliminary data

Full Immersion Research Experience
FIRE graduates present at the CSUNposium

BIOL447/L
FIRE lab

CSUNposium
Grad
Research?

Fall
Spring
Summer

A CURE for Disordered Sleep

Cheryl Van Buskirk
CSUN Biology
cheryl.vanbuskirk@csun.edu
The authors thank the laboratories of Kaveh Ashrafi, Dennis Kim, and Susan Mango for generously providing several of the strains used in this study. We are grateful to the students of the Fall 2015 BIOL447/L Full Immersion Research Experience laboratory for their investigation of sleep responses among dauer-defective mutants and to Andrew J. Hill for comments on the manuscript. This work was supported by an NSF-CAREER award IOS 1553673 to C.V.B. Some strains were provided by the Caenorhabditis Genetics Center, which is funded by NIH Office of Research Infrastructure Programs (P40 OD010440).

The authors thank the Caenorhabditis Genetics Center (CGC) and Ikue Mori for strains. Special thanks to Alex Hernandez of BIOL447/L for observing that wounding could trigger ALA-dependent sleep. This article is dedicated to Sydney Brenner.
app1-1 mutants are primarily defective in head movement quiescence during C. elegans sleep

Figure 1: The BBS macrogenes promote head movement quiescence but not locomotory quiescence during lethargus and in response to light. A-C. Locomotion was assessed for headlessness per minute among animals during (A) the adult C. elegans (L1), during the young adult stage (L2), and during worms induced latency in the young adult stage following exposure to high light (B) or in C. elegans pass-through worms (C). Animals were monitored for 90 min from L2 to L3. B-D. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. E-G. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. H-I. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. J-K. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. L-M. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. N-O. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. P-Q. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. R-S. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. T-U. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. V-W. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3. X-Y. Locomotion was assessed for the number of worm body length (A) or head movements (B) generated per minute from L2 to L3.
FIRE lab: project progresses each semester

1. Mutagenesis screen for sleepless mutants
2. Phenotypic characterization & genetic mapping
3. Genomic DNA isolation & WGS
4. Candidate gene identification
5. Confirmation: complementation or RNAi

A CURE for Disordered Sleep
FIRE lab: project progresses each semester

Mutagenesis screen for sleepless mutants

Genomic DNA isolation & WGS

Confirmation: complementation or RNAi

Phenotypic characterization & genetic mapping

Candidate gene identification

A CURE for Disordered Sleep
FIRE lab: project progresses each semester

Mutagenesis screen for sleepless mutants

Genomic DNA isolation & WGS

Candidate gene identification

Phenotypic characterization & genetic mapping

Confirmation: complementation or RNAi

A CURE for Disordered Sleep
A CURE for Disordered Sleep

Research Highlights

• Sleep is mediated by a neuron called ALA

• Sleepless mutants are impaired for recovery from heat stress
Cellular repair limits sleep duration

UV-induced sleep

- wild-type
- xpa-1(rf)
- ALA(rf)
- xpa-1(rf) ALA(rf)

Fraction immobile

hours after UV exposure

A CURE for Disordered Sleep
Lessons Learned

Worm genetics is challenging for most students

and

Teaching a CURE is a lot of work

but

NSF support of Course-based Undergraduate Research promotes highly effective integration of research and education
Next Steps/Long-Term Plans

- Pipeline CURE: repeated exposure in core classes to concepts and model system used in FIRE
- Align future research program to better match student background

‘Spreading FIRE’: expand CUREs at CSUN, with common objectives
Summary

• Cellular damage, at least in some organisms, appears to contribute to sleep pressure

• For NSF-CAREER, education and research components should be mutually beneficial
A Geologic Perspective on Assessing Seismic Risk in California, and How my CAREER Grant relates

Kimberly Blisniuk– San Jose State University
Geology in hazard assessment

• What is the role of geology in hazard assessment

  Geology provides deformation models for earthquake hazard assessment and earthquake probabilities
Deformation models and fault slip rates

- A fault’s slip rate is directly proportional to its hazard potential.
- Geologic fault slip rates are estimated by measuring the rate at which a landform moves over time.

Kimberly Blisniuk  SJSU/Geology  Kimberly.Blisniuk@sjsu.edu
San Andreas Fault slip rates and hazard probability

Fault slip rates: $22^{+2/}_{-2} \text{mm/yr}$

*Kimberly Blisniuk*  
SJSU/Geology  
Kimberly.Blisniuk@sjsu.edu
Hazard model for EQ ruptures

Preferred hazard model based on previous studies

A southern SAF earthquake will likely rupture on the Banning fault strand through a broadly distributed zone of right-lateral, thrust and oblique faults.

Alternative hazard model based on this study

A southern SAF earthquake may rupture on the Mission Creek fault and continue northward on a narrow structure through the San Gorgonio Pass, instead of following the Banning fault strand.

Kimberly Blisniuk  SJSU/Geology  Kimberly.Blisniuk@sjsu.edu
A Geologic Perspective on Assessing Seismic Risk in California, and How my CAREER Grant Relates
A Geologic Perspective on Assessing Seismic Risk in California, and How my CAREER Grant Relates

Geology is critical to EQ hazard assessment
Asymmetric ER Partitioning as a Pathway for Cell Fate Specification

*Blake Riggs – San Francisco State University*

Blake Riggs, Associate Professor
San Francisco State University, Department of Biology
riggs@sfsu.edu
Asymmetric ER partitioning as a pathway for cell fate specification

Blake Riggs  San Francisco State University/Biology  riggs@sfsu.edu
Activities

- Investigate cytoplasmic organization during cell division
- Understanding the dynamic nature of organelles during mitosis
- Deepen our understanding of the role of cytoplasmic organization and the function of cell division and generation of cell diversity.
The Endoplasmic Reticulum is partitioned asymmetric during early Drosophila embryogenesis


Blake Riggs  San Francisco State University/Biology  riggs@sfsu.edu
ER asymmetric partitioning relies on the integral membrane protein Jagunal (Jagn)

Results

Blake Riggs
San Francisco State University/Biology
riggs@sfsu.edu

Results

Jagn is partitioned asymmetrically in pro-Neuroblast (NB) and display spindle rotation defects in NB deficient for \textit{jagn}

Figure 4


Figure 5

Blake Riggs
San Francisco State University/Biology
riggs@sfsu.edu
Jagn deficient brain lobes display defects in cell fate selection

**Results**

A

Pros / Dpn / DAPI

Control

janD16N

B

Jagn Mutants Exhibits Increased NB Populations

![Graph showing increased NB counts in Jagn mutants compared to wildtype.](attachment:Graph_B.png)

C

Jagn Mutants Exhibits a Decrease in Differentiated Cell Populations

![Graph showing decreased differentiation counts in Jagn mutants compared to wildtype.](attachment:Graph_C.png)

D

Nuclear Counts in Wildtype and Jagn Mutants

![Bar chart comparing nuclear counts between wildtype and Jagn mutants.](attachment:Graph_D.png)

E

Nuclear Size in Wildtype and Jagn Mutants

![Bar chart comparing nuclear size between wildtype and Jagn mutants.](attachment:Graph_E.png)

---

Blake Riggs  
San Francisco State University/Biology  
riggs@sfsu.edu
Broader Impacts: connecting SFSU students with the community

STEM day at SFSU with Carver Scholars

Dinner with a Scientist

Riggs lab members being recognized by the City of SF
Lessons Learned

• Organization and outlining of projects is key in a master’s serving institution
• Learn when to change course and let go of projects
• Less sometimes can be more
• Practice empathy
• Everyone can do science (growth mindset)
• Find likeminded scientist and collaborators
• Remember who you are and why you are here
• Never give up!
Next Steps/Long-Term Plans

• More Funding!!!
• Characterizing the structural role of the ER in organization and delivery of cell fate determinants during neurogenesis
• Understanding the role of microRNAs in regulation of cell fate selection
• Investigating the connection between organelles during cell division
  • Endosomal networks
  • Mitochondria
• Create a service-learning course dedicated to STEM mentoring

Asymmetric ER Partitioning as a Pathway for Cell Fate Specification

Blake Riggs
San Francisco State University/Biology
riggs@sfsu.edu
Summary

• The ER is partitioned asymmetrically in pro-neuronal cells in the early Drosophila embryo
• Asymmetric ER partitioning relies on the highly conserved ER membrane protein Jagunal
• Jagunal is involved in the pathway for neuronal cell fate selection
• Broader Impacts: Connected SFSU students to the SF community and helped create a Black STEM group, BE-STEM
• 13 of MS students trained in my lab are in R1 PhD programs

Gerson Ascencio
Emily Conrad
Alia Edington
Nicole Rodrigues (Marshall Lab, UCSF)
Alma Aracely Martinez Peraza
Rozhin Lak,
Ricardo Solis
Matthew DeCruz,
Jessica Bolivar-McPeek
Bethany Ramos Morin
Cynnie Tam
Jose Ortega
Tsrendavaa “David” Mendaikhan
Katharine Eichelberger
Jamarc Allen-Henderson
Jessica Paz

Blake Riggs
San Francisco State University/Biology
riggs@sfsu.edu
Computational Gravitational-Wave Physics and Astronomy at California State University, Fullerton

Geoffrey Lovelace – California State University, Fullerton

Collaborators:
Simulating eXtreme Spacetimes Collaboration,
LIGO Scientific Collaboration

Geoffrey Lovelace, Associate Professor
California State University, Fullerton, Department of Physics
glovelace@Fullerton.edu
Project Overview

- Nicholas & Lee Begovich Center for Gravitational-Wave Physics and Astronomy
  - Research, education, & outreach in gravitational-wave science
  - 4 faculty members, 25 students, 33 alumni in Ph.D. programs, industry, and teaching
- CAREER: Computational gravitational-wave science and education in the era of first observations
  - Modeling colliding black holes & neutron stars
  - Modeling thermal noise in gravitational-wave optics
  - 1-week summer workshop for community-college students

**Geoffrey Lovelace**  Cal State Fullerton/ Physics
glovelace@Fullerton.edu

Simulation by Nick Demos
Activities

- Merging black holes and neutron stars
  - Use Spectral Einstein Code (SpEC), supercomputers to calculate gravitational waves & warped spacetime
  - Results help interpret observations
- Thermal noise in crystalline mirror coatings
  - Error from approximating crystal as glass?
- Workshop
  - Gravitational waves & high-performance computing
  - Numerical Python programming
  - Simulate & visualize colliding black holes with SpEC
  - Interact with students in my research group

Geoffrey Lovelace  Cal State Fullerton/ Physics  glovelace@Fullerton.edu
Results

• Research
  • Contribute calculations, help assess accuracy of catalog of 2000+ simulated colliding black holes
    Boyle et al, Class. Quantum Grav. 36, 195006 (2019), Fullerton authors include GL, N Afshari, N Demos, A Garcia, R Katebi, H Khan, T Ramirez, S Rodriguez
  • Challenging to measure rapid black-hole spins from gravitational-wave observations
  • Treat crystal as glass: ~3% change in thermal noise
    GL, N Demos, H Khan, Class. Quantum Grav. 35, 025017 (2017)

• Workshop
  • Held in 2018, 2019 with ~20 Citrus College students each year
  • Marlo Morales: 2019 participant, now member of my research group

Movie courtesy CSU Fullerton undergraduate Teresita Ramirez
Lessons Learned

• Flexibility in research direction
  • Simulations with neutron stars proved challenging
  • Solution: help build SpECTRE, next-generation numerical-relativity code (https://spectre-code.org)

• Proposal strategy
  • Year 1 — RUI (awarded)
  • Year 4 — RUI (awarded) + CAREER (declined)
  • Year 5 — CAREER (awarded)
    • Build a track record with other funding first
    • Research component must sparkle
    • Don’t neglect the educational component
    • Play to our strengths in the CSU integrating research and education

Geoffrey Lovelace    Cal State Fullerton/ Physics    glovelace@Fullerton.edu
Next Steps/Long-Term Plans

• Next steps
  • Enable SpECTRE to simulate merging black holes
    • Uses new techniques enabling it to run effectively on 100,000 cores (vs. 50 cores for Spectral Einstein Code)
    • Example: task-based parallelism
  • Apply SpECTRE code to thermal-noise modeling
  • Workshop assessment and followup

• Long term plans
  • Apply SpECTRE calculations to interpreting high-precision results from future gravitational-wave detectors

Geoffrey Lovelace
Cal State Fullerton / Physics
glovelace@Fullerton.edu

First SpECTRE simulation of binary black hole
Color: how much slower clocks tick compared to far away
Summary

- Computational gravitational-wave science & education
  - Model colliding black holes & neutron stars
  - Model thermal noise in detector optics
  - Introduce community college students to computing & gravitational waves

Geoffrey Lovelace  
Cal State Fullerton / Physics  
glovelace@Fullerton.edu
BUILD: Bringing the Universe to IE and LA Districts

Matthew Povich – Cal Poly Pomona

Collaborators – CPP alumni (current affiliation):
B. A. Binder (CPP) • T. Jayasinghe (Ohio State) • D. M. Dixon (Vanderbilt)
• J. T. Maldonado • G. Nguyen (San Diego State) • L. K. Townsley & P. S.
Broos (Penn State) • H. A. Kobulnicky (U. Wyoming) • E. H. Nuñez & M.
A. Kuhn (Caltech)
Project Overview

- **Intellectual Merits**: A new calibration of galactic star formation rate indicators and spatially-resolved maps of the present-day star formation rate in our own Milky Way Galaxy.

- **Broader Impacts**: Expand opportunities for members of underrepresented minority groups to participate in astronomy.

Principal outcomes, by the numbers…

- 15 peer-reviewed papers published + 2 in preparation by project team members, *including two led by undergraduate students.*
- >20 conference presentations and invited talks by the PI, postdoc, and undergraduate students
- 12 undergraduate researchers involved in project activities; 8 proceeded to graduate school in physics or astronomy
- >45,000 citizen scientists contributed to the online Milky Way Project
- >3,000 attendees at 24 BUILD public-outreach events

- **Led by CPP undergraduate T. Jayasinghe** (class of 2017), who designed and implemented a brand-new data reduction pipeline.
- Aggregated 3 million classification drawings by >45,000 volunteer citizen scientists on MWP website from 2010–2018.
- Published **catalogs of 2600 IR bubbles and 599 IR bow shocks**, including 341 new candidate massive stars.
Bright X-ray Stars in Carina

- CPP alumnus E. H. Nuñez et al. (2020, in prep) analyzed X-ray observations of intermediate-mass (2–5 $M_{\odot}$) pre-main-sequence stars (IMPS) in the Carina Nebula.
- **Fully-convective IMPS** are more X-ray luminous than other coronal-flaring X-ray sources.
- **Radiative-IMPS** fade dramatically in X-rays during the first few Myr of their lives, making them a useful stellar population for age-dating star-forming regions.
Bright X-ray Stars in Carina

• CPP alumnus E. H. Nuñez et al. (2020, in prep) analyzed X-ray observations of intermediate-mass (2–5 $M_{\odot}$) pre-main-sequence stars (IMPS) in the Carina Nebula.

• **Fully-convective IMPS** are more X-ray luminous than other coronal-flaring X-ray sources.

• **Radiative-IMPS** fade dramatically in X-rays during the first few Myr of their lives, making them a useful stellar population for age-dating star-forming regions.

Hard-band (2–8 keV) X-ray luminosity functions for full 370 stars in the Carina Nebula.
Observational tracers for Milky Way and extragalactic star formation rates are generally consistent, assuming:

• universal distribution of stellar masses.
• same models to describe radiative output and winds of massive stars.

However, massive stellar winds and radiation remove dust from ionized nebulae within 2 Myr. Typical observational tracers assume longer timescales and hence may underestimate actual star formation rates.

Exponential decay with timescale <2 Myr.

Thermal IR surface brightness versus age measured from resolved, X-ray-selected IMPS populations (Povich+19 and in prep.)
Successful students

D. Dixon (CPP ’17 → Vanderbilt Ph.D.), C. J. Lintott (Zooniverse PI), & T. Jayasinghe (CPP ’17 → Ohio State Ph.D.)

J. Maldonado (CPP ’16 → Michigan State M.S. ’18)

G. Nguyen (CPP ’20 → San Diego State M.S.)

PI Povich and E. H. Nuñez (CPP ’19 → Caltech Ph.D. + NSF GRF)
Future Plans/Lessons for JCs

• Currently, I’m completely swamped with teaching a full load of remote classes! Junior colleagues (JCs): get your reassigned time from grants to stay productive!

• Research priorities (1) read through Evan’s draft, polish, and send to the 3 coauthors for final comments before submission, (2) finish drafting my own latest paper, and do the same. JCs: Try to balance student projects with your own research and writing.

• Submit re-proposal to NSF for grant that would extend our IR bow shocks+citizen science work for 3 more years. Was turned down last year. JCs: when rejected, try and try again!

• Still waiting for outcome of a big NASA collaborative proposal to do a multi-institutional project on searching for extraterrestrial technosignatures. Decisions clearly delayed by COVID-19, unclear how funding has been impacted. JCs: Be patient! Tenured colleagues: Be understanding!

• My public-outreach project had the brakes slammed on it by COVID-19, which coincided with expiration of funding. Will I have time/energy to try and restart it next year? JCs: Sustainability is hard.
Research Highlights Since Receipt of the NSF CAREER Award

Nina Robson–California State University, Fullerton

Nina Robson, Associate Professor
Cal State Fullerton, Department of Mechanical Engineering
nrobson@Fullerton.edu
Problem: Many industry-related labor-intensive manual tasks are difficult to automate due to high levels of variations/uncertainties within the operating environment.

Goal: Advance basic knowledge on human-robot interaction and environment uncertainties and incorporate some of those conditions on design level leading to next generation robotic devices working alongside with humans.

Research Highlights Since Receipt of the NSF CAREER Award

Nina Robson
CSUF, Mechanical Engineering
e-mail: nrobson@fullerton.edu
Proposed Design Framework Assessment

Solving several design problems provided by industry collaborators and engaging students’ in the development, validation and dissemination process

Healthcare Community: Explore the automation of a repetitive manual tasks related to physical training of upper and lower extremity for post-stroke patients (St. Jude Center for Rehabilitation and Wellness, CA).

Biomedical Industry: Automating a repetitive manual biomedical sewing process of an implantable cloth used in artificial heart-valve surgery (Edwards Lifesciences, CA).

Agricultural Industry: Automating a labor-intensive manual harvesting and potato sorting on a conveyor belt tasks (Spudnik Equipment, ID).

Nina Robson
CSUF, Mechanical Engineering
nrobson@fullerton.edu
Goal: Prepare the next generation of engineers of a broad diversity

• Enhancing the mechanical design curriculum by emphasizing early cross-disciplinary research, innovation and entrepreneurship activities

• Middle/high-school summer program on Increasing Diversity in Engineering And Labor-force (IDEAL)

• Targeted Student Research (TranSfeR) outreach program

[Image of students in a laboratory setting]
Highlights: NSF Innovation Corps (I-Corps) Teams

CSUPERB I-Corps (1-week duration in San Diego, CA)
Curriculum Goal: Focus beyond the University lab to explore the commercial potential of a novel Augmented Reality WEarable Device (ARWED)

Advanced to NSF I-Corps Team Curriculum
LA Cohort (2 months online with two 3-day in person meetings)

Nina Robson  
CSUF, Mechanical Engineering  
nrobson@fullerton.edu
Highlights: Senior Design Project Course

**Bristol Industries Team**: Initiated the automation of hazardous manual chemical processes for Bristol Industries, Brea, CA

**Intensive Care Unit (ICU) Patient Walker Team at SCCUR**: Worked with a start up company in CA to assist them in getting a newly designed and manufactured ICU Walker on the market

**Edwards Lifesciences Team at CSUPERB**: Submitted a joint US Patent Application on automating the manual sewing of a biomedical cloth used in artificial heart-valve replacement surgery

CAREER Proposal Advice/Tips

• Talk to industry, business partners, users of products/technologies, colleagues, etc. to find out what the needs are and think how you/your students can address them. Apply for CSUPERB/NSF I-Corps and go through the curriculum.

• Establish a lab from grants and start up funds, where students can be hired to work on research. Engage students in research. Generate pilot data and publish research papers on the proposed CAREER topic.

• Propose a broad research agenda with high societal impact and think of ways to show that it could be even broader.

• Prepare a Summary of your proposed research and educational activities, send it to NSF PD and schedule a meeting. Keep in mind that after talking to the PD you might have to tweak your idea to fit within the areas of interest.

• Don’t be afraid to show that the research you are proposing is complex/ambitious and you/your students would not be able to accomplish it on your own. Include partners in the proposal that are excited about collaborating with you.

• Schedule at least one additional meeting with the PD to discuss any concerns that you might have, before the submission deadline. When discussing concerns BE HONEST AND OPEN. Remember that the NSF PDs are there to HELP YOU TO BE SUCCESSFUL.
Future Work at the Human-Technology Frontier NSF 10 Big Ideas for the Future Investment

“The workplace of tomorrow is going to be a symbiotic co-existence and collaboration among humans, machines and cyberspace. Interdisciplinary science and engineering research is needed to understand the benefits and risks of the new technologies and to enable the creation of these technologies with which humans will collaborate to enrich their lives in the future workplaces.”

https://youtu.be/Gh3UX7XvXhM
Questions & Answers
Speaker Contacts
Chantal Stieber, Cal Poly Pomona
sestieber@cpp.edu

Cheryl Van Buskirk, CSUN
cheryl.vanbuskirk@csun.edu

Kimberly Blisniuk, San Jose State University
kimberly.blisniuk@sjsu.edu

Blake Riggs, San Francisco State University
riggs@sfsu.edu

Geoffrey Lovelace, Cal State Fullerton
glovelace@Fullerton.edu

Matthew Povich, Cal Poly Pomona
mspovich@cpp.edu

Nina Robson, Cal State Fullerton
nrobson@Fullerton.edu
Next Steps/Closing Remarks

Dr. Frank A. Gomez
Executive Director, STEM-NET
Office of the Chancellor

https://www2.calstate.edu/impact-of-the-csu/research/stem-net
Webcast Feedback Survey
Please take a few moments to tell us about your webcast experience
https://forms.gle/828DBpeoKEMbqkDz8

Join our CSU STEM-NET Community listserv
csustemnet@lists.calstate.edu

Begin a Conversation with Colleagues and Join our Private CSU STEM-NET Facebook Group
https://www.facebook.com/groups/2629611737269292
Register Today and Join Us

STEM-NET Virtual Research Café
10.0 4th Event

November 5th @ 2pm-3pm

Register Here:
https://tinyurl.com/y3wu39ed

Meet The Presenters
https://www.youtube.com/watch?v=LgjyGnQjEMw

Dr. Marta Miletić
Assistant Professor
Department of Civil, Construction, and Environmental Engineering
San Diego State University
Presentation Topic: Towards increased Resilience, Durability, and Sustainability: Computational and Experimental Modeling of Novel Civil Infrastructure Materials

Dr. Jorge H. Monteiro
Assistant Professor
Department of Chemistry
Humboldt State University
Presentation Topic: Lanthanide Luminescent Compounds for more Efficient Diagnosis and Photodynamic Therapy

Dr. Kristen Gorman
Assistant Professor
Department of Biological Sciences
California State University, Chico
Presentation Topic: Seeking to Characterize Mechanical Properties of Scoliosis Bone Cells

Frank A. Gomez
CSU Office of the Chancellor
fgomez@calstate.edu
Registration Opens Soon

“Applications in Artificial Intelligence/Machine Learning”
Thursday, November 19th @10am-12pm

“Exemplars in Biology”
Thursday, December 10th @10am-12pm