

In-person | Education Building, UC Davis, School of Medicine, 4610 X St, Sacramento, CA 95817

This inaugural WHS Science Symposium brings together key opinion leaders and the science research community - especially young investigators –to present emerging technologies and scientific breakthroughs related to the scientific understanding of wound healing and new technology in wound care. This Inaugural meeting will focus on the **Biophysical control of Wound Healing**.

### Thursday, October 27, 2022

7:30 – 8:10 am **Registration and Breakfast**

#### **Welcoming Remarks**

8:10 – 8:20 am **Rivkah Isseroff, MD, Min Zhao, MD PhD**

#### **8:20 - 10:15 am. SESSION 1. BioMechanical factors in wound healing**

This session will discuss the key biomechanical controls of wound healing responses

**Moderator: Rivkah Isseroff, MD**

**8:20 - 8:40 am. Swathi Balaji, PhD, Baylor College of Medicine**  
Mechano-transduction control of fibrosis

**8:40 - 9:00 am. Torbjörn Lundh, PhD, University of Gothenburg**  
How wound shape alters healing

**9:00 - 9:20 am. Kris Kieswetter, PhD 3M Company**  
Negative pressure's impact on wound healing

**9:20 - 9:40 am. Michelle Griffin, MD, PhD Stanford University**  
Mechanobiology of wound healing

**9:40 - 9:50 am. Tugba Ozdemir, PhD, South Dakota School of Mines and Technology.**  
Biomedical Engineering Program

Hyaluronic acid binding peptide regulates extracellular matrix deposition and diminish fibroblast activation

**9:50 - 10:00 am. Srisathya Srinivasan, PhD, Department of Cell Biology, UC Davis**  
Wnt5a-Ror signaling regulates cell migration and contractility via RhoA-Myosin-Actin axis

**10:00 - 10:15 am. Q&A and Panel Discussion**

10:15 – 10:30am (15 min) **Networking & Refreshment Break**

#### **10:30 am -12:15 pm. SESSION 2. BioPhysical control of cellular and subcellular behavior**

This session highlights the novel mathematical and biophysical insights in wound healing

**Moderator: Min Zhao MD PhD**

**10:30 – 10:50 am. Peter Devreotes, PhD, Johns Hopkins**  
Dynamics of membrane surface charge regulates cell migration

**10:50 – 11:10 am. Wolfgang Losert, PhD, University of Maryland**  
Biophysical and bioelectrical control of cell function.

**11:10 – 11:30 am. John Fourkas, PhD, University of Maryland**  
Nanotopographic guided cellular responses

**11:30 – 11:45 am. Quan Qing, PhD, Arizona State University**  
Inhibition of proliferation and motility through electrostatic modulation of ERK signaling pathway

**11:45 - 12:00 am. Wei Chen, PhD, Dept. Physics, University of South Florida**  
Electrically driven Na/K pumps

**12:00 am - 12:15 pm Q&A and Panel Discussion**

**12:15 – 1:15 pm. Lunch & Networking**  
Catered lunch for attendees

**1:15 pm- 2:35 pm. SESSION 3. Bioelectronic Medicine**

This session focuses on the cutting-edge review of BioElectronic Medicine

**Moderator: Mark Mannis, MD**

**1:15 pm-1:20 pm. Mark Mannis, MD**, University of California, Davis  
Electrical therapies in ophthalmology

**1:20 -2:05pm. Keynote Address:**

**Kevin Tracey, MD**, Feinstein Institute for Medical Research  
**Advances in BioElectronic Medicine**

This keynote speech focuses on the cutting-edge review of BioElectronic Medicine

**2:05 - 2:20 pm. Gautam Kumar, PhD**, Chemical and Materials Engineering, San Jose State University

Closed-loop optimization of vagus nerve stimulation for the cardiovascular system: an in-silico computational study

**2:20 - 2:35 pm. Q&A and Panel Discussion**

**2:35 – 3:35 pm. SESSION 4. DARPA BETR program**

This session highlights the ongoing work of the DARPA BETR Program

**Moderator: Min Zhao, MD PhD**

**2:35 - 2:55 pm. Marco Rolandi**, Engineering, UC Santa Cruz  
A bioelectronic approach to intelligent wound healing"

**2:55 - 3:10 pm. Ksenia Zlobina, PhD** UC Santa Cruz  
Applied Mathematics Department

Control of the wound healing using wound stage probabilities: a mathematical model

**3:10 - 3:20 pm. Yao-Hui Sun, PhD**, University of California Davis

Macrophage electrotaxis and electrical modulation of immune cell function

**3:20 - 3:35 pm. Q&A and Discussion Panel**

**3:35 – 3:50 (15 min) Networking & Refreshment Break**

**3:50- 4:45 pm. SESSION 5. Shock waves and Biomaterials**

**Moderator: Min Zhao MD PhD**

**3:50 - 4:10 pm. Paul Slezak, MD**, Ludwig Boltzmann Institute of Traumatology, Vienna, Austria.  
Shock wave modulation of biological function

**4:10 - 4:20 pm. Victoria Thai**, UC Davis

Matrix remodeling modulates therapeutic potential of heterotypic cell spheroids

**4:20 – 4:30 pm. Yao Ke, DDS, PhD** UC Davis: Dept. Pathology & Laboratory Medicine

Treatment effect of Smad7-based protein on diabetic wounds in a preclinical porcine model

**4:30-4:45 pm. Q&A and Discussion Panel**

**4:45- 5:30 pm. SESSION 6. Poster Session**

**Networking & Reception for registered attendees and speakers.**

**5:30 pm Dinner on your own**

## Friday, October 28, 2022

7:50 – 8:10 am **Registration & Breakfast**

8:10 – 8:15 am. **Remarks** (5 min) Min Zhao and Rivkah Isseroff

### 8:15 – 9:45 am. Session 7. Bioelectrical mechanisms in wound healing

This session highlights advances moving bioelectric modulation to clinical translation

**Moderator: Rivkah Isseroff, MD**

**8:15 - 8:35 am. Kath Bogie, D.Phil**, Case Western Reserve University

Electrical stimulation of wound healing

**8:35 - 8:55 am. Daria Narmoneva, PhD**, University of Cincinnati

Wireless electrotherapy for wound repair

**8:55 - 9:15 am. Cunjiang Yu, PhD**, Penn State University

Soft Deformable Bioelectronics towards Seamless Integration with Tissues and Organs

**9:15- 9:30 am. Siwei Zhao, PhD**, University of Nebraska

A novel high-intensity electric current-based chronic wound biofilm treatment system

**9:30- 9:45 am.** Discussion Panel – Q&A

9:45 – 10:00 am. **Refreshment Break**

### 10:00 - 10:35 am. Session 8. Rapid Poster talks

Rapid fire (5 min) poster presentations selected from submitted abstracts

**10:00 - 10:05 am. Bryan Le, MSc.** UC Davis.

Reducing Sialylations Increases Cathodal Migration during Electrotaxis in Corneal Epithelial Cells

**10:05 - 10:10 am. Chelsea Brown, MSc.** UC Davis.

Characteristics of oxygen and reactive oxygen species during murine cornea wound healing

**10:10 - 10:15 am. Mahjuba Zehra, BDS.** University at Buffalo School of Dental Medicine

Role of TGF-beta1 in directed energy wound therapeutics

**10:15 - 10:20 am. Alexis Tensfeldt, BS,** University at Buffalo

Directed energy wound therapeutics with high-frequency glow discharge and photobiomodulation

**10:20 – 10:25 am. Hengyue Song, MD,** UC Davis

A biocompatible scaffold engineered with proangiogenic proteoglycan mimetics and loaded with endothelial cells promotes deep burn wound healing.

**10:25 – 10:30 am. Ana Sandoval Castellanos, PhD.** UC Davis

A new ocular model to safely study sulfur mustard injuries

**10:30 – 10:35 am. Kan Zhu, PhD.** UC Santa Cruz, UC Davis.

Physiological electric fields guide mouse macrophage directional migration and promote macrophage polarization to accelerate wound healing.

10:35 - 11:00 am. Session 9. Poster Viewing and Refreshments

**11:00 am - 12: 10 pm. SESSION 10. Ocular BioElectroceuticals**

This session highlights advances made in the engineering of bioactive approaches to ocular disease.

**Moderator: Kim Gokoffski, MD, PhD**

**11:00 - 11:20 am. Kimberly Gokoffski, MD, PhD, University of Southern California**  
Electrical regulation of optical nerve regeneration

**11:20 - 11:40 am. Paul Sieving, MD, PhD, University of California, Davis**  
Trans-ocular electric current in vivo enhances AAV-mediated retinal gene transduction after intravitreal vector administration

**11:40 - 11:45 am. Kenichi Nakajima, PhD, Department of Dermatology, UC Davis**  
High glucose significantly impairs cornea bioelectricity  
– a potential contributor to impaired wound healing in diabetes

**11:45 - 11:55 am. Timothy Kim, BSc, Keck School of Medicine of USC**  
In vivo application of electric fields collaborate with c-rheb to direct optic nerve regeneration after crush injury

**11:55 am - 12:10 am. Q&A and Discussion Panel**

**12:10 – 12:30 pm. Final Poster session and poster removal.**

**12: 30 pm – 1:45 pm. Lunch & Networking**

**1:45 - 2:00 pm. Session 11.**

**Young investigator awards  
Poster awards presentations**

**2:00 – 3:05 pm. Session 12. Photobiomodulation Therapy for Oral and Dermal Wounds**

This session will cover photobiologic modulation of wound biology.

**Moderator: Rivkah Isseroff**

**2:00 - 2:20 pm. Praveen Arany, DDS, PhD, University at Buffalo, School of Dental Medicine**  
Photomodulation in wound healing (adipocyte fate)

**2:20 - 2:30 pm. Victoria Da Silva Oliveira, PhD, University at Buffalo**  
Evaluation of photobiomodulation therapy on endothelial cell functions in diabetic wounds

**2:30 - 2:50 pm. Lin Tian, PhD, Department of Biochemistry, UC Davis**  
Optogenetics as a tool for photobiomodulation

**2:50 - 3:05 pm. Discussion Panel – Q&A**

**3:05 pm. Closing Remarks**

Min Zhao and Rivkah Isseroff

**Conference Concludes**

**3:20 pm.**