PHYSIOLOGICAL SENSING & MODULATION FOR HUMAN HEALTH & PERFORMANCE

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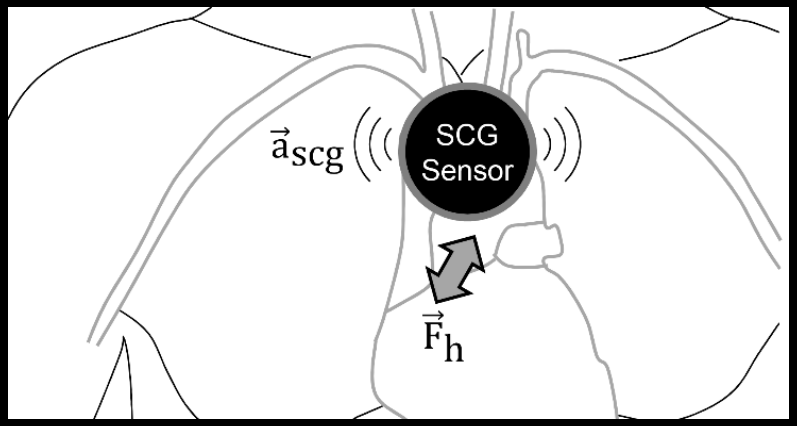
CREATING THE NEXT®

WEARABLE SEISMOCARDIOGRAM SENSING FOR PATIENTS WITH HEART FAILURE

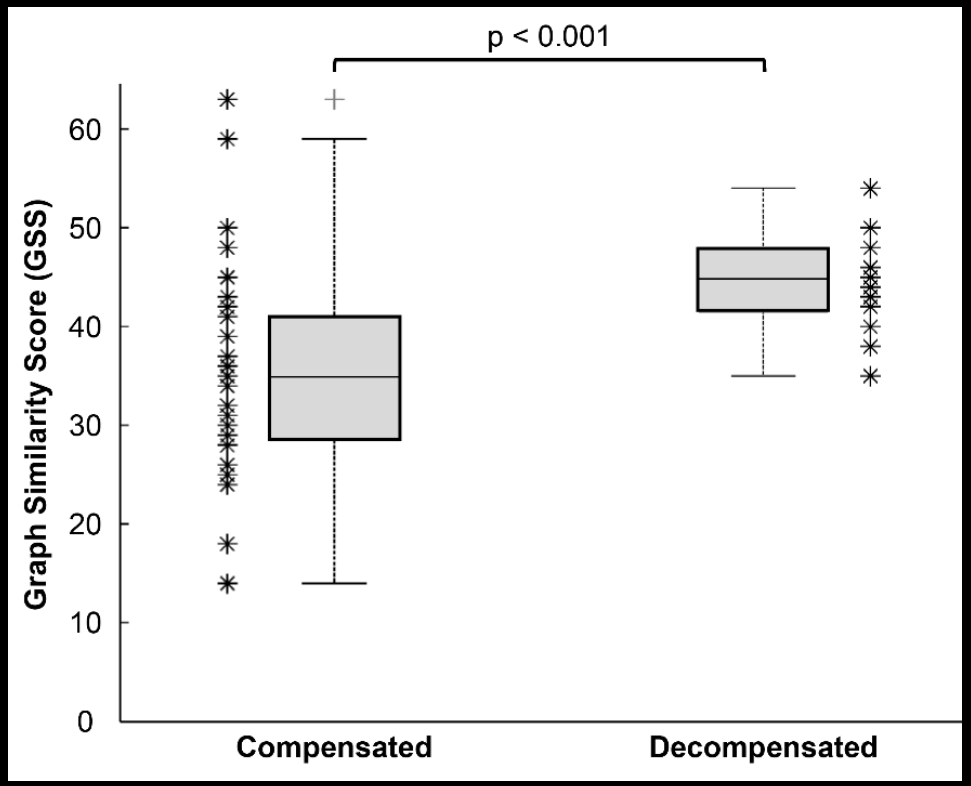
Georgia Tech

Collaboration with Dr. Liviu Klein at UCSF and Dr. Mozzi Etemadi at Northwestern



- Seismocardiogram (SCG) signals are measured with a wearable chest patch
- Measurements before and after six minute walk test exercise are used to assess patients' clinical state

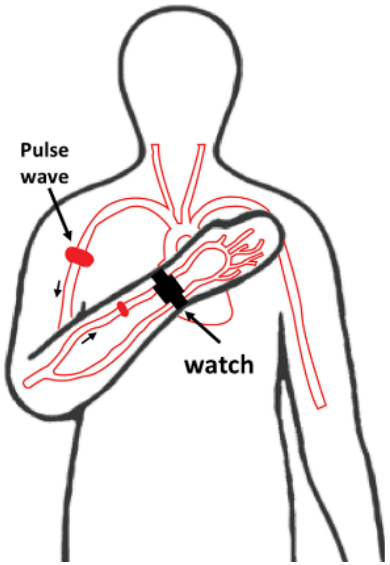
- *Goal: Predicting and preventing heart failure exacerbations with home monitoring*

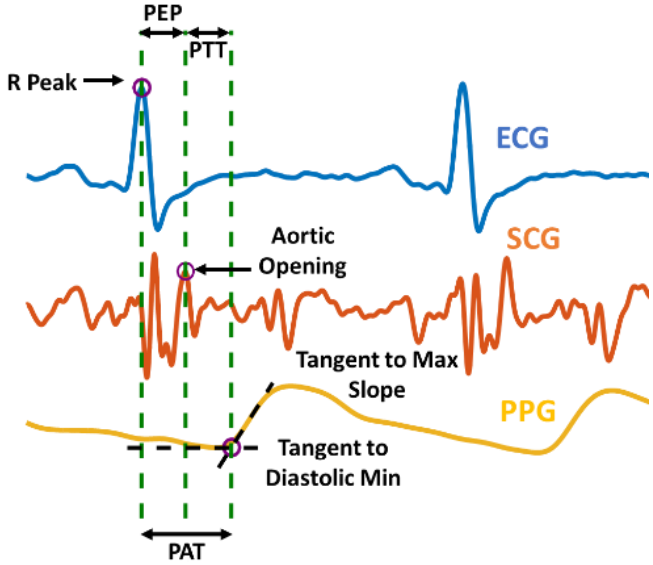


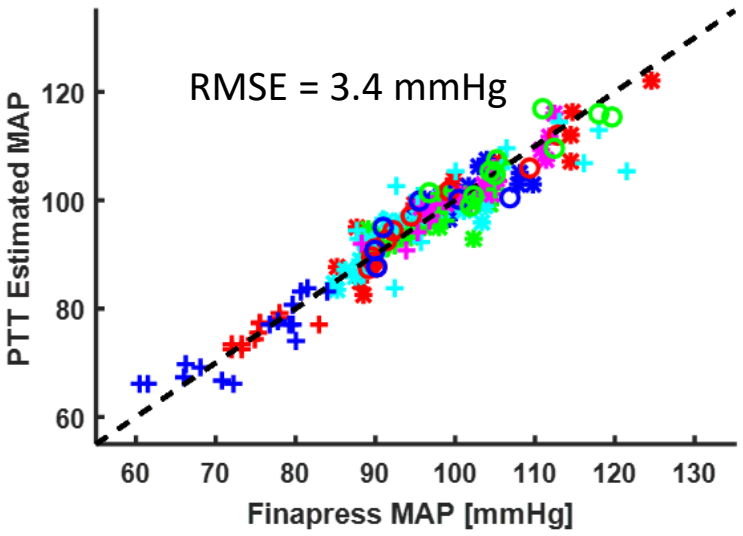
Inan, et al. **Circulation: Heart Failure**, 2018.

CUFFLESS BLOOD PRESSURE MEASUREMENT USING SEISMOWATCH

Collaboration with Dr. Rama Mukkamala at MSU and Dr. Jin-Oh Hahn at UMD







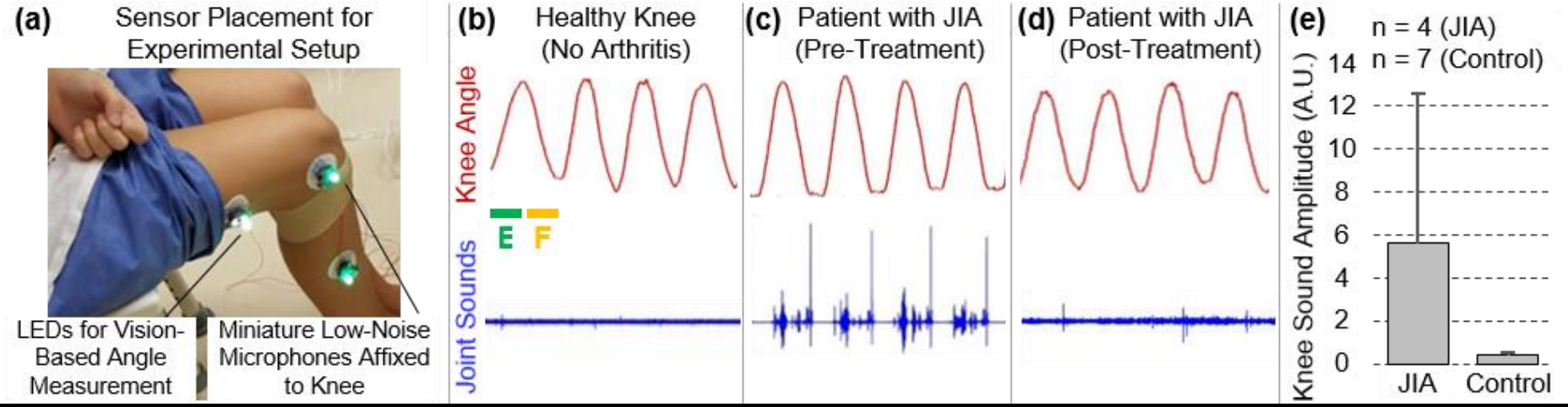
- Pulse transit time (PTT) is measured using a watch form factor with the user placing the device against the chest.
- After initial calibration, PTT based blood pressure estimation yields low error for a wide range of perturbations.

Carek, et al. **ACM IMWUT**, 2017.

NSF CAREER: WEARABLE JOINT SOUNDS SENSING FOR KIDS WITH ARTHRITIS

Georgia Tech

Collaboration with Dr. Sampath Prahalad at Children's Healthcare of Atlanta



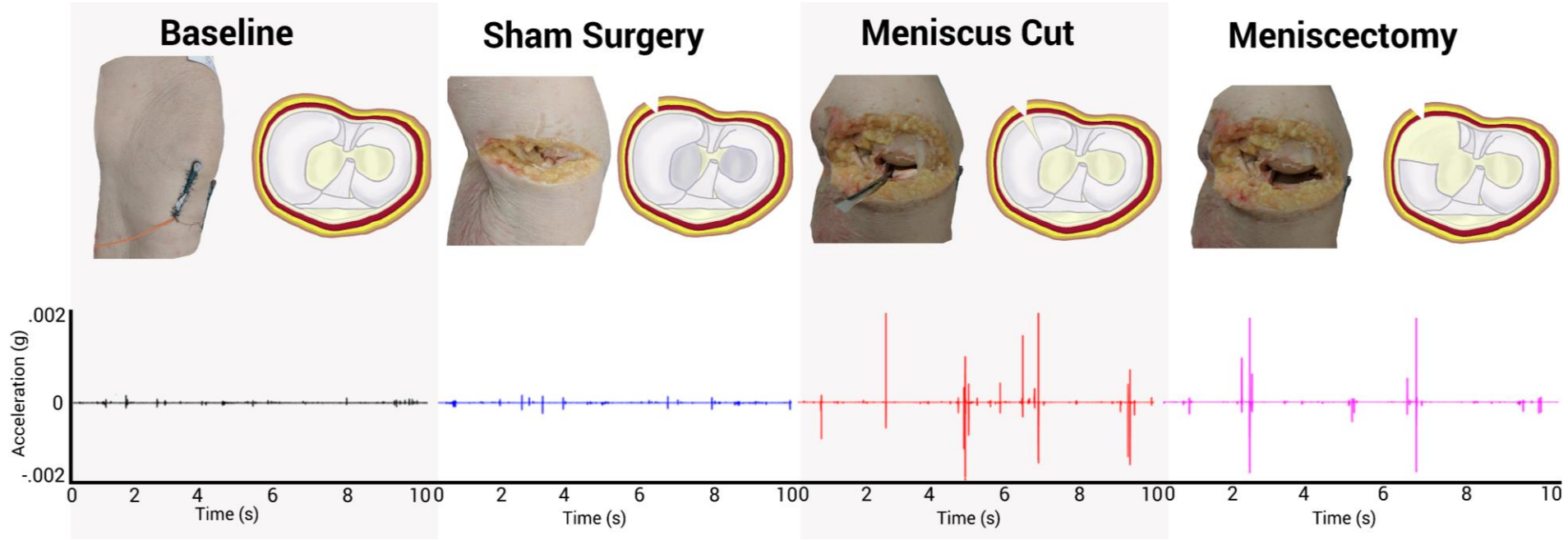
- 50,000 children in US have juvenile idiopathic arthritis (JIA)
- Many therapies exist, but matching a therapy to each patient is currently based on trial and error
- Continuous monitoring would allow for therapies to be personalized to each patient using objective data

- *Wearable joint sounds measurements can address this clinical need*

Joint swelling is common for JIA

Semiz, et al. **IEEE Sensors Journal,** 2018.

ELUCIDATING THE MECHANISMS OF JOINT SOUNDS WITH A CADAVER MODEL

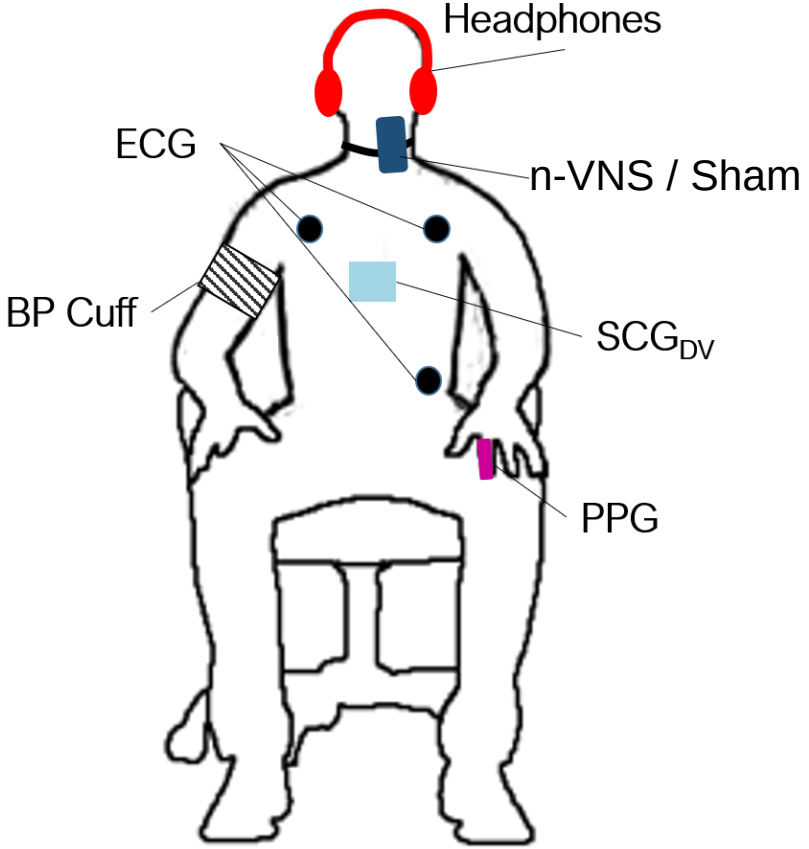


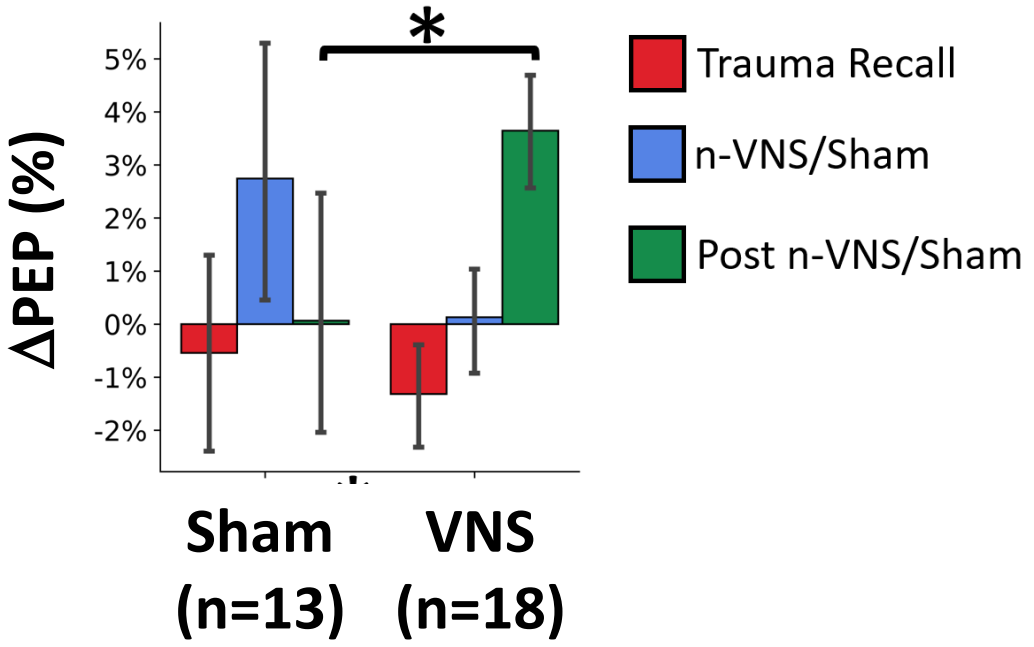
- We used fresh frozen cadaver models such as those employed in training for orthopedic surgery.
- A total of n=9 limbs were studied to better understand the origin of joint acoustic emissions and to provide a clean dataset for algorithm development.

NON-INVASIVE VAGUS NERVE STIMULATION IN PATIENTS WITH PTSD

Georgia Tech

Collaboration with Dr. Doug Bremner at Emory University





- Sympathetic arousal in response to the recall of the traumatic event is blunted with VNS
- Brain imaging results show similar patterns

Gurel, et al. **IEEE Body Sensor Networks Conf,** 2018.

INAN RESEARCH LAB AT GEORGIA TECH

Active Grants / Contracts

ONR YIP
NSF CAREER 1749677
NIH NHLBI 1R01HL130619
NIH NIBIB 1R01EB23808
NIH NIBIB 1U01EB018818
DARPA BTO N66001-16-2-4054
Children's Healthcare of Atlanta
Craig H. Neilsen Foundation
Georgia Research Alliance
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Shuvo Roy (UCSF)
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