

Adnan Al Armouti

<https://adnan-armouti.github.io/>

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Education	Cornell University , Ithaca, NY, USA Doctor of Philosophy, Computer Science University of California, Los Angeles , Los Angeles, CA, USA Master of Science, Electrical and Computer Engineering GPA: overall 4.0/4.0 University of California, Los Angeles , Los Angeles, CA, USA Bachelor of Science, Electrical Engineering and Economics (Double)	Starting August 2023 September 2021-Present Graduation: Expected June 2023 September 2017-June 2021 Graduation: June 2021
Publications	Vilesov, A., Chari, P., Armouti, A. , Harish, A.B., Kulkarni, K., Deoghare, A., Jalilian, L. and Kadambi, A., 2022. Blending camera and 77 GHz radar sensing for equitable, robust plethysmography. <i>ACM Transactions on Graphics (TOG)</i> , 41(4), pp.1-14.	
Patents	Kadambi, A., Jalilian, L., Chari, P., Talegaonkar, C., Karinca, D., Cannesson, M., Kabra, K., Salehi-Abari, O., Kita, A., Armouti, A. 2021. "Systems and Methods for Measuring Vital Signs Using Multimodal Health Sensing Platforms," Int'l Application PCT/US19/22532, filed June 16, 2021. Kadambi, A., Jalilian, L., Abari, O., Cannesson, M., Kita, A., Chari, P., Armouti, A. 2021. "MMHEALTH: Multimodal Health Sensing Platform," US Provisional Application 63/177,229, filed April 20, 2021.	
Presentations	<i>Computational Imaging: Single Image Dehazing and Contactless Health Sensing</i> . UCLA ACM AI Undergraduate Research Forum, October 20 2022. <i>Blending Camera and 77 GHz Radar Sensing for Equitable, Robust Plethysmography</i> . [Co-presented]. ACM Special Interest Group on Graphics, Computational Photography Roundtable Session, August 08 2022 (SIGGRAPH '22). <i>Blending Camera and 77 GHz Radar Sensing for Equitable, Robust Plethysmography</i> . [Poster, Co-presented]. IEEE International Conference on Computational Photography, August 01 2022 (ICCP '22).	
Research Experience	UCLA Visual Machines Group with Prof. Achuta Kadambi Worked on <i>equitable robust plethysmography</i> as co-first author. <ul style="list-style-type: none">• Led a successful \$1M DARPA grant proposal to fund research projects in contactless equitable health sensing and mobile health (mHealth).• Open-sourced Python multimodal data processing library for our deep learning (DL) pipelines.• Developed PyTorch DL models including CNNs and Vision Transformers to estimate a patient's vital signs contactlessly via camera-radar fusion, including photoplethysmography (PPG), the skin color changes due to pulsatile blood flow; physiological respiration; blood oxygenation (SpO2) via ratio-of-ratios (ROR) method; and respiratory effort of the chest.• Co-implemented a neural implicit decomposition framework for robust out-of-distribution photoplethysmography with state of the art results on patients with medical arrhythmia conditions such as atrial fibrillation, and patients in optically challenging environments such as low light, partial occlusions, and double pane reflections.• Co-built pulse transit time pipelines to estimate blood pressure, via radar and RGB data.• Implemented prior "baseline" methods from existing literature for comparison against ours.• Co-wrote the IRB and safety compliance amendments, and led our data collection.• Designed paper figures via Inkscape, Photoshop and Illustrator.	September 2020-Present
Employment Experience	UCLA Health with Dr. Ashley Kita Research Intern - Working on <i>Contactless Sleep Apnea Detection</i> as the first author.	June 2022-December 2022

- Built data acquisition multimodal imaging and radar stack using triple NIR based FLIR Grasshopper3 camera system, with active illumination at 940nm, 850nm and 766nm, a FLIR Boson 640 Radiometric camera and TI AWR1443BOOST RF sensor.
- Developed multimodal fusion models for robust radar-thermal respiratory waveform detection and radar-NIR cardiac waveform detection
- Developed Vision Transformer models for contactless estimation of respiratory rate and effort via long-wave infra-red and mmWave sensors, with application in apnea event detection.
- Developing anomaly detection models that classify apnea and hypopnea events from vital sign time-series data; currently working with contact-based gold-standard signals to verify automation feasibility.
- Developing causal inference pipelines to predict event onset, with plans to extend this to sepsis, arrhythmia, atrial fibrillation, and other diseases.

UCLA Visual Machines Group

June 2021-September 2021

Summer Research Intern

- Designed, sourced, and built a multimodal sensing system that senses in the visible, near infra-red, long wave infra-red and millimeter-wave (mmWave) radio bands.
- Built GPIO hardware-triggered system, enabling microsecond-level synchronized exposure.
- Co-built an open-sourced C++ multithreaded data acquisition codebase for our sensor stack.

California NanoSystems Institute

June 2020-September 2020

Summer Research Intern

- Used open source DeepLebCut ResNet CNN to create real-time marker-less pose estimation system for mice subjected to neuro-stimuli by electrodes, for behaviorally-triggered “closed-loop” brain-machine interface
- 1/10th the cost of an NDI Polaris Vega system, gold standard for Parkinson’s Disease research.

Other
Experience

Cornell CS, *Teaching Assistant, Upcoming*
Cornell IS, *Teaching Assistant, Upcoming*

Starting August 2023
Starting August 2023

Awards

2023 UCLA ECE Distinguished Master’s Thesis Research Award	May 2023
2023 UCLA ECE SIGGRAPH 2023 Los Angeles Travel Grant – \$500	April 2023
2022 UCLA ECE SIGGRAPH 2022 Vancouver Travel Grant – \$1,500	August 2022
2022 UCLA ECE ICCP 2022 Pasadena Travel Grant – \$500	July 2022
2022 UCLA ECE CVPR 2022 New Orleans Travel Grant – \$1,500	June 2022
2022 UCLA ECE VMG GSR Scholarship – \$1,000	January 2022
2021 NSF REU Fellowship – \$7,500	June 2021
2021 UCLA ECE Dean’s Honors List	March 2021
2020 Intel URP Scholarship – \$1,250	September 2020
2020 SRC URP Scholarship – \$1,250	June 2020
2020 UCLA ECE Dean’s Honors List	June 2020

Community
Involvement

UCLA ECE VMG Mentoring Program, <i>Mentor</i>	September 2022-Present
UCLA ACM AI Undergraduate Research Program, <i>Research Mentor</i>	September 2022-Present
IEEE, <i>Student Member</i>	May 2022-Present
ACM, <i>Student Member</i>	May 2022-Present

References

Prof. Achuta Kadambi

Assistant Professor of Electrical and Computer Engineering & Computer Science at UCLA, **Email:** achuta@ee.ucla.edu

Dr. Ashley Kita

Assistant Professor-in-Residence of Head & Neck Surgery at UCLA Health, **Email:** akita@mednet.ucla.edu

Dr. Laleh Jalilian

Clinical Assistant Professor of Anesthesiology & Perioperative Medicine at UCLA David Geffen School of Medicine, **Email:** ljalilian@mednet.ucla.edu