Yasser Khan

1002 Childs Way, Michelson Center for Convergent Bioscience, #270D, Los Angeles, CA 90089

+1-214-914-1726 • yasser.khan@usc.edu • khan.usc.edu

Summary

I am an engineer/maker/scientist working on multi-disciplinary projects at the intersection of engineering, materials science, biology, and artificial intelligence. My research focuses on additive manufacturing and hardware AI to produce skin-like wearables, implantables, and ingestibles. These medical devices are being used for precision health and psychiatry.

Research Interests

Materials and Devices: wearable/implantable/ingestible electronics, sensors, medical devices, bioelectronics, biophotonics.
Manufacturing and Systems: flexible/stretchable/printed/hybrid electronics, additive manufacturing, in-sensor processing, machine learning on edge systems.
Application: health/mental health monitoring, precision health/psychiatry.

Education

University of California, Berkeley, CA, USA
Ph.D. in Electrical Engineering and Computer Sciences — *Dec '18*
GPA 3.95/4.00, Concentration: Physical Electronics.

Dissertation: Wearable medical sensors enabled by printed bioelectronics and biophotonics.
Advisor: Professor Ana Claudia Arias.

KAUST, KSA
M.S. in Electrical Engineering — *Dec '12*
GPA 3.92/4.00, Concentration: Optoelectronics and Photonics.

Thesis: Light management in optoelectronic devices with disordered and chaotic structures.
Advisor: Professor Boon Ooi; Co-Advisor: Professor Andrea Fratalocchi.

University of Texas at Dallas, TX, USA
B.S. in Electrical Engineering — *May '10*
GPA 3.98/4.00, Summa Cum Laude, Concentration: Electronics.

Senior Design Project: Wireless embedded control system for atomically precise manufacturing.
Faculty Advisor: Professor Murat Torlak; Industry Advisor: John Randall, PhD.

Experience

University of Southern California, CA, USA
Assistant Professor of Electrical and Computer Engineering — *Jan '22–Present*

Postdoctoral Scholar in Chemical Engineering

Stanford University, CA, USA
Jan '19–Dec '21
Stanford

- Wearable sensor system for biochemical analysis of bodily fluids
  Designed and implemented a wearable sensor system that collects and processes data from a variety of sensors for real-time analysis of bodily fluids.
- Wearable mental health monitoring platform
  Developed a skin-like sensor platform that utilizes physiological and chemical sensors to monitor mental health biotypes.
- Non-invasive ventilator for COVID-19
  Designed a non-invasive ventilator with a helmet interface that is safe, low-cost, portable, and can provide relief to early-stage COVID-19 patients.

Advisor: Professor Zhenan Bao; Co-Advisor: Professor Boris Murmann.

Ph.D. Student

University of California, Berkeley, CA, USA
Jul '13–Dec '18
Berkeley UNIVERSITY OF CALIFORNIA

- Printed biophotonic sensors for blood and tissue oximetry
  Demonstrated a flexible organic reflectance oximeter array capable of 2D oxygenation mapping of blood and tissue [4]. Developed the first printed organic optoelectronic sensor for transmission-mode pulse oximetry [6]. Additionally, reported a reflection-mode organic oximeter probe for pulse oximetry on the wrist [12].
- Printed bioelectronic sensors for electrocardiography (ECG), electromyography (EMG), and bioimpedance spectroscopy
  Developed a fabrication process for producing thin, printed, and flexible electrode arrays that non-invasively map pressure-induced tissue damage via bioimpedance spectroscopy, even when such damage cannot be visually observed [7, 8]. Also, demonstrated printed electrode arrays for wearable ECG and EMG [7].
- Integration of printed sensors to flexible hybrid electronics for wearable health monitoring
  Developed a wearable sensor patch composed of inkjet-printed gold ECG electrodes and a stencil-printed nickel oxide thermistor to record ECG and human body temperature [5].
- Other Responsibilities: Designing and maintaining the group website: arias.berkeley.edu.

Advisor: Professor Ana Claudia Arias.

Research Intern

University of California, Berkeley, CA, USA
Oct '12–Jun '13
Berkeley UNIVERSITY OF CALIFORNIA

- Printed optoelectronic probe for pulse oximetry
  Developed hardware and software for interfacing conventional electronics with organic light-emitting diodes (OLEDs) and organic photodiodes (OPDs) for measuring blood oxygen saturation [6].

Advisor: Professor Ana Claudia Arias.

Research Intern

Oxford University, OX, UK
Jul '11–Aug '11
UNIVERSITY OF OXFORD

- Enhancing light scattering and absorption in dye-sensitized solar cells (DSSCs) with air voids in TiO_2 nano-spheres
  With Mie theory and T-matrix formulation calculated scattering properties of air voids in TiO_2 nano-spheres. Optimized air void sizes and concentrations for greater efficiencies in DSSCs.

Math Advisor: James Kirkpatrick, PhD; Physics Advisor: Professor Henry Snaith.

Graduate Student Researcher — KAUST, KSA — *Sep '10–Jul '12*

- Energy harvesting in complex systems
  Experimentally investigated light trapping capabilities of deformed microstructures for energy harvesting [22].
- Zinc oxide (ZnO) nanorods for simultaneous light trapping and transparent electrode applications in solar cells
  Studied light concentrating properties of ZnO nanorods, and at the same time evaluated those for using as transparent electrodes [15].
- Electrochemical etching of tungsten tips for scanning tunneling microscopy (STM) and atomic force microscopy (AFM)
  Etched ultra-sharp metallic tips for scanning probe microscopy. [21].
- Other Responsibilities: Designing and maintaining the group website: photonics.kaust.edu.sa.

Advisor: Professor Boon Ooi; Co-Advisor: Professor Andrea Fratalocchi.

Research Intern — Stanford University, CA, USA — *Jul '10–Aug '10*

- Silver nanowire transparent electrodes for replacing existing Indium Tin Oxide (ITO) transparent electrodes in organic solar cells
  Worked on solution synthesis to produce 10μm length silver nanowires. Developed a Matlab tool to analyze the electrical response of silver nanowires, and wrote an image processing program for processing SEM images of nanowires.

MSE Advisor: Professor Yi Cui; EE Advisor: Professor Peter Peumans.

Hardware Design Intern — Zyvex Labs, TX, USA — *Jan '10–Jun '10*

- Computer controlled electrochemical etcher to produce extremely sharp tips for use in STM
  Developed hardware and software for an automated electrochemical tip etcher. Zyvex Labs commercialized the etcher as Zetcher.

Advisor: Joshua Ballard, PhD.

Grants

- $852,777 ($5,684,619 total) funding from National Institute of Health (NIH), PI: Maryam Shanechi, Co-I: Yasser Khan for a project to develop "Novel multimodal neural, physiological, and behavioral sensing and machine learning for mental states" *2024–2028*
- $100,000 ($300,000 total) funding from Pratt & Whitney Institute for Collaborative Engineering, PI: Sifat Muin, Co-PI: Yasser Khan for a project to develop "Printed Sensors for Continuous Monitoring of Stress Corrosion Cracking in Aircraft Materials" *2024–2025*
- $50,000 funding from USC Zumberge for a project to develop "Skin-line wearable sensor development for diagnostic ECG and MRI at 0.55 T" *2024–2025*
- $60,000 funding from Google for a project to develop "Racial Bias Correction in Oximetry using Google's Skin Tone Framework" *2023–2024*
- $100,000 funding from Schlumberger Foundation for a project to develop "Hardware technologies for mental health applications" *2023–2024*
- $750,000 funding from National Science Foundation (NSF) for a project proposed by Stanford University to develop "Artificial Intelligence-enabled Multimodal Stress Sensing for Precision Health" *2020–2022*
- $700,000 funding from NextFlex, America's Flexible Hybrid Electronics (FHE) Manufacturing Institute for a

project proposed by UC Berkeley, UCSD, and Jabil Circuits to develop "Integration Processes for Flexible and Wearable Wound Monitoring and Therapeutic Bandage" *2017–2018*

- $375,000 funding from Intel Corporation via. Semiconductor Research Corporation Grant No. 2014-IN-2571 for a project proposed by UC Berkeley to develop "Printable and Flexible Electronics for Wearable System Integration" *2015–2017*
- $425,000 funding from Nano-Bio Manufacturing Consortium (NBMC), an industry-academia partnership with the United States Air Force Research Laboratory (AFRL), for a project proposed by Binghamton University, UC Berkeley, and electronics packaging firm i3 Electronics, Inc. (Endicott, N.Y.) to develop "Electronics and Biometric Sensor Platforms for Human Performance Monitoring (HPM)" *2014–2015*

Publications

Please check google scholar for the most up-to-date publications list.

Journal Articles

[1] Angsagan Abdigazy, Mohammed Arfan, June Shao, Mohammad Shafiqul Islam, Md Farhad Hassan, and **Yasser Khan**. 3d gas mapping in the gut with ai-enabled ingestible and wearable electronics. **Cell Reports Physical Sciences**, 2024.

[2] Angsagan Abdigazy, Mohammed Arfan, Gianluca Lazzi, Constantine Sideris, Alex Abramson, and **Yasser Khan**. End-to-end design of ingestible electronics. **Nature Electronics**, pages 1–17, 2024. doi: 10.1038/s41928-024-01122-2. URL http://dx.doi.org/10.1038/s41928-024-01122-2.

[3] Peter H Charlton, John Allen, Raquel Bailón, Stephanie Baker, Joachim A Behar, Fei Chen, Gari D Clifford, David A Clifton, Harry J Davies, Cheng Ding, and others. The 2023 wearable photoplethysmography roadmap. **Physiological measurement**, 44(11):111001, 2023.

[4] **Yasser Khan**, Donggeon Han, Adrien Pierre, Jonathan Ting, Xingchun Wang, Claire M Lochner, Gianluca Bovo, Nir Yaacobi-Gross, Chris Newsome, Richard Wilson, and Ana C Arias. A flexible organic reflectance oximeter array. **Proceedings of the National Academy of Sciences**, 115(47):E11015–E11024, 2018. doi: 10.1073/pnas.1813053115. URL http://dx.doi.org/10.1073/pnas.1813053115. **Media coverage: Physics World, UC Berkeley News Center, KCBS Radio, Innovators Magazine, The Engineer (UK), Medgadget, ScienceDaily, and many more.**

[5] **Yasser Khan**, Mohit Garg, Qiong Gui, Mark Schadt, Abhinav Gaikwad, Donggeon Han, Natasha AD Yamamoto, Paul Hart, Robert Welte, William Wilson, Steve Czarnecki, Mark Poliks, Zhanpeng Jin, Kanad Ghose, Frank Egitto, James Turner, and Ana C Arias. Flexible hybrid electronics: Direct interfacing of soft and hard electronics for wearable health monitoring. **Advanced Functional Materials**, 26(47):8764–8775, 2016. doi: 10.1002/adfm.201603763. URL http://dx.doi.org/10.1002/adfm.201603763.

[6] Claire M Lochner*, **Yasser Khan***, Adrien Pierre*, and Ana C Arias. All-organic optoelectronic sensor for pulse oximetry. **Nature communications**, 5:5745, 2014. doi: 10.1038/ncomms6745. URL http://dx.doi.org/10.1038/ncomms6745. ***Equal contribution. Media coverage: UC Berkeley Grad News, NSF Science 360 News, UC Berkeley News Center, Phys.Org, ScienceDaily, MSN News, Yahoo News, and many more.**

[7] **Yasser Khan***, Felippe J Pavinatto*, Monica C Lin, Amy Liao, Sarah L Swisher, Kaylee Mann, Vivek Subramanian, Michel M Maharbiz, and Ana C Arias. Inkjet-printed flexible gold electrode arrays for bioelectronic interfaces. **Advanced Functional Materials**, 26(7):1004–1013, 2016. doi: 10.1002/adfm.201503316. URL http://dx.doi.org/10.1002/adfm.201503316. **Cover article.**

[8] Sarah L Swisher, Monica C Lin, Amy Liao, Elisabeth J Leeflang, **Yasser Khan**, Felippe J Pavinatto, Kaylee Mann, Agne Naujokas, David Young, Shuvo Roy, Michael R Harrison, Ana C Arias, Vivek Subramanian, and Michel M Maharbiz. Impedance sensing device enables early detection of pressure ulcers in vivo. **Nature communications**, 6:6575, 2015. doi: 10.1038/ncomms7575. URL http://dx.doi.org/10.1038/ncomms7575. **Media coverage: BBC News, UC Berkeley News Center, Futurity, NSF News, ACM Communications, and many more.**

[9] **Yasser Khan**, Aminy E Ostfeld, Claire M Lochner, Adrien Pierre, and Ana C Arias. Monitoring of vital signs with flexible and wearable medical devices. **Advanced Materials**, 28(22):4373–4395, 2016. doi: 10.1002/adma.201504366. URL http://dx.doi.org/10.1002/adma.201504366.

[10] **Yasser Khan**, Hossain Mohammad Fahad, Sifat Muin, Hongquan Li, Ray Chang, Karthik Gopalan, Syed Tariq Reza, and Manu Prakash. A low-cost, helmet-based, non-invasive ventilator for covid-19. 2020. URL https://arxiv.org/abs/2005.11008.

[11] **Yasser Khan**, Donggeon Han, Jonathan Ting, Maruf Ahmed, Ramune Nagisetty, and Ana C. Arias. Organic multi-channel optoelectronic sensors for wearable health monitoring. **IEEE Access**, 2019. doi: 10.1109/ACCESS.2019.2939798. URL http://dx.doi.org/10.1109/ACCESS.2019.2939798.

[12] Donggeon Han, **Yasser Khan**, Jonathan Ting, Simon M King, Nir Yaacobi-Gross, Martin J Humphries, Christopher J Newsome, and Ana C Arias. Flexible blade-coated multicolor polymer light-emitting diodes for optoelectronic sensors. **Advanced Materials**, 29(22):1606206, 2017. doi: 10.1002/adma.201606206. URL http://dx.doi.org/10.1002/adma.201606206.

[13] Xiaodong Wu, **Yasser Khan**, Jonathan Ting, Juan Zhu, Seiya Ono, Xinxing Zhang, Shixuan Du, James W. Evans, Canhui Lu, and Ana C. Arias. Large-area fabrication of high-performance flexible and wearable pressure sensors. **Advanced Electronic Materials**, n/a(n/a):1901310, 2020. doi: 10.1002/aelm.201901310. URL http://dx.doi.org/10.1002/aelm.201901310.

[14] Xiaodong Wu, Maruf Ahmed, **Yasser Khan**, Margaret E. Payne, Juan Zhu, Canhui Lu, James W. Evans, and Ana C. Arias. A potentiometric mechanotransduction mechanism for novel electronic skins. **Science Advances**, 6(30), 2020. doi: 10.1126/sciadv.aba1062. URL http://dx.doi.org/10.1126/sciadv.aba1062.

[15] Donggeon Han, **Yasser Khan**, Jonathan Ting, Juan Zhu, Craig Combe, Andrew Wadsworth, Iain McCulloch, and Ana C. Arias. Pulse oximetry using organic optoelectronics under ambient light. **Advanced Materials Technologies**, n/a(n/a):1901122, 2020. doi: 10.1002/admt.201901122. URL http://dx.doi.org/10.1002/admt.201901122.

[16] Donggeon Han, **Yasser Khan**, Karthik Gopalan, Adrien Pierre, and Ana C Arias. Emission area patterning of organic light-emitting diodes (oleds) via printed dielectrics. **Advanced Functional Materials**, 28(37):1802986, 2018. doi: 10.1002/adfm.201802986. URL http://dx.doi.org/10.1002/adfm.201802986.

[17] Varun Soman, **Yasser Khan**, Madina Zabran, Mark Schadt, Paul Hart, Michael Shay, Frank Egitto, Konstantinos Papathomas, Natasha AD Yamamoto, Donggeon Han, Ana C Arias, Kanad Ghose, Mark D Poliks, and James N Turner. Reliability challenges in fabrication of flexible hybrid electronics for human performance monitors: A system level study. **IEEE Transactions on Components, Packaging and Manufacturing Technology**, 2019. doi: 10.1109/TCPMT.2019.2919866. URL http://dx.doi.org/10.1109/TCPMT.2019.2919866.

[18] Leeya Engel, Chengming Liu, Nofar Mintz Hemed, **Yasser Khan**, Ana Claudia Arias, Yosi Shacham-Diamand, Slava Krylov, and Liwei Lin. Local electrochemical control of hydrogel microactuators in microfluidics. **Journal of Micromechanics and Microengineering**, 28(105005), 2018. doi: 10.1088/1361-6439/aacc31. URL http://dx.doi.org/10.1088/1361-6439/aacc31.

[19] Abhinav M Gaikwad, **Yasser Khan**, Aminy E Ostfeld, Shishir Pandya, Sameer Abraham, and Ana Claudia Arias. Identifying orthogonal solvents for solution processed organic transistors. **Organic Electronics**, 30: 18–29, 2016. doi: 10.1016/j.orgel.2015.12.008. URL http://dx.doi.org/10.1016/j.orgel.2015.12.008. **Solvents visualization program is available in the Downloads section: http://arias.berkeley.edu/downloads/**.

[20] Aminy E Ostfeld, Abhinav M Gaikwad, **Yasser Khan**, and Ana C Arias. High-performance flexible energy storage and harvesting system for wearable electronics. **Scientific reports**, 6:26122, 2016. doi: 10.1038/srep26122. URL http://dx.doi.org/10.1038/srep26122.

[21] **Yasser Khan**, Hisham Al-Falih, Yaping Zhang, Tien Khee Ng, and Boon S Ooi. Two-step controllable electrochemical etching of tungsten scanning probe microscopy tips. **Review of Scientific Instruments**, 83(6): 063708, 2012. doi: 10.1063/1.4730045. URL http://dx.doi.org/10.1063/1.4730045.

[22] Changxu Liu, Andrea Di Falco, D Molinari, **Yasser Khan**, Boon S Ooi, Thomas F Krauss, and Andrea Fratalocchi. Enhanced energy storage in chaotic optical resonators. **Nature Photonics**, 7(6):473, 2013. doi: 10.1038/nphoton.2013.108. URL http://dx.doi.org/10.1038/nphoton.2013.108. **Cover article. Media coverage: EurekAlert!, nanowerk, Photonics.com, ScienceDaily, Phys.Org, and many more.**

[23] Ali Moin, Andy Zhou, Abbas Rahimi, Alisha Menon, Simone Benatti, George Alexandrov, Senam Tamakloe, Jonathan Ting, Natasha Yamamoto, **Yasser Khan**, Fred Burghardt, Luca Benini, Ana C. Arias, and Jan M. Rabaey. A wearable biosensing system with in-sensor adaptive machine learning for hand gesture recognition. **Nature Electronics**, n/a(n/a), 2020. doi: 10.1038/s41928-020-00510-8. URL http://dx.doi.org/10.1038/s41928-020-00510-8.

[24] Alla M. Zamarayeva, Natasha A. D. Yamamoto, Anju Toor, Margaret E. Payne, Caleb Woods, Veronika I. Pister, **Yasser Khan**, James W. Evans, and Ana Claudia Arias. Optimization of printed sensors to monitor sodium, ammonium, and lactate in sweat. **APL Materials**, 8(10):100905, 2020. doi: 10.1063/5.0014836. URL http://dx.doi.org/10.1063/5.0014836.

[25] Sara Rachel Arussy Ruth, Vivian Rachel Feig, Min-gu Kim, **Yasser Khan**, Jason Khoi Phong, and Zhenan Bao. Flexible fringe effect capacitive sensors with simultaneous high-performance contact and non-contact sensing capabilities. **Small Structures**, n/a(n/a):2000079, 2020. doi: 10.1002/sstr.202000079. URL http://dx.doi.org/10.1002/sstr.202000079.

[26] Sara RA Ruth, Min-gu Kim, Hiroki Oda, Zhen Wang, **Yasser Khan**, James Chang, Paige M Fox, and Zhenan Bao. Post-surgical wireless monitoring of arterial health progression. **Iscience**, 24(9):103079, 2021. doi: 10.1016/j.isci.2021.103079. URL http://dx.doi.org/10.1016/j.isci.2021.103079.

[27] Megan Chesnut, Sahar Harati, Pablo Paredes, **Yasser Khan**, Amir Foudeh, Jayoung Kim, Zhenan Bao, and Leanne M. Williams. Stress markers for mental states and biotypes of depression and anxiety: A scoping review and preliminary illustrative analysis. **Chronic Stress**, 5(n/a), 2021. doi: 10.1177/24705470211000338. URL http://dx.doi.org/10.1177/24705470211000338.

[28] **Yasser Khan**, Matthew L. Mauriello, Parsa Nowruzi, Akshara Motani, Grace Hon, Nicholas Vitale, Jinxing Li, Jayoung Kim, Amir Foudeh, Dalton Duvio, Erika Shols, Megan Chesnut, James Landay, Jan Liphardt, Leanne Williams, Keith D. Sudheimer, Boris Murmann, Zhenan Bao, and Pablo E. Paredes. Design considerations of a wearable electronic-skin for mental health and wellness: balancing biosignals and human factors. **bioRxiv**, 2021. doi: 10.1101/2021.01.20.427496. URL https://www.biorxiv.org/content/early/2021/01/21/2021.01.20.427496.

[29] **Yasser Khan** and Zhenan Bao. A soft-electronic sensor network tracks neuromotor development in infants. **Proceedings of the National Academy of Sciences of the United States of America**, 118(46):e2116943118, 2021. doi: 10.1073/pnas.2116943118. URL http://dx.doi.org/10.1073/pnas.2116943118.

[30] Alex Abramson, Carmel Chan, **Yasser Khan**, Alana Mermin-Bunnell, Naoji Matsuhisa, Robyn Fong, Rohan Shad, William Hiesinger, Parag Mallick, Sanjiv Sam Gambhir, and Zhenan Bao. A flexible electronic strain sensor for the real-time monitoring of tumor progression. **Science Advances**, 2022. doi: 10.1126/sciadv.abn6550. URL http://dx.doi.org/10.1126/sciadv.abn6550. **Media coverage: USC News, Stanford News, Georgia Tech News, and many more.**

Conference Proceedings

[1] Felix Munoz, Mohammad Shafiqul Islam, Helmut Stark, Ted Le, Krishna S Nayak, and **Yasser Khan**. Flexible receiver coil using direct-3d-write technology at 0.55t. In *International Society for Magnetic Resonance in Medicine Meeting, Singapore*. ISMRM, 2024.

[2] Mohammad Shafiqul Islam, Brince Kunnel, Md Farhad Hassan, Angsagan Abdigazy, and **Yasser Khan**. Fully-printed micro-oect patch for real-time sweat multi-analyte detection. In *MRS Spring Meeting, San Francisco, CA, USA*. MRS, 2023.

[3] Felix Munoz, Krishna S Nayak, and **Yasser Khan**. Evaluation of a wearable bluetooth sensor in low-field mri. In *International Society for Magnetic Resonance in Medicine Meeting, Toronto, Canada*. ISMRM, 2023.

[4] Md Farhad Hassan, Zijie Li, Mohammad Shafiqul Islam, Kathryne Keenan, Cevina Manzano, **Yasser Khan**, and Sifat Muin. A robust printed strain sensor for large-area structural health monitoring. In *2023 IEEE International Flexible Electronics Technology Conference (IFETC)*, pages 1–3. IEEE, 2023.

[5] **Yasser Khan**, Donggeon Han, Adrien Pierre, Jonathan Ting, Xingchun Wang, Claire M. Lochner, and Ana C. Arias. System design for flexible all-organic reflectance oximeter. In *MRS Spring Meeting, Phoenix, AZ, USA*, 2018.

[6] Donggeon Han, **Yasser Khan**, Karthik Gopalan, and Ana C. Arias. Emission area patterning of blade-coated organic light-emitting diodes (oleds) via printed dielectrics. In *MRS Spring Meeting, Phoenix, AZ, USA*, 2018.

[7] Ali Moin, Andy Zhou, Abbas Rahimi, Simone Benatti, Alisha Menon, Senam Tamakloe, Jonathan Ting, Natasha Yamamoto, **Yasser Khan**, Fred Burghardt, and others. An emg gesture recognition system with flexible high-density sensors and brain-inspired high-dimensional classifier. In *Circuits and Systems (ISCAS), 2018 IEEE International Symposium on*, pages 1–5. IEEE, 2018. doi: 10.1109/ISCAS.2018.8351613. URL http://dx.doi.org/10.1109/ISCAS.2018.8351613.

[8] Mark Poliks, James Turner, Kanad Ghose, Zhanpeng Jin, Mohit Garg, Qiong Gui, Ana Arias, Yasser Kahn, Mark Schadt, and Frank Egitto. A wearable flexible hybrid electronics ecg monitor. In *Electronic Components and Technology Conference (ECTC), 2016 IEEE 66th*, pages 1623–1631. IEEE, 2016. doi: 10.1109/ECTC.2016.395. URL http://dx.doi.org/10.1109/ECTC.2016.395.

[9] **Y. Khan** and A. C. Arias. Flexible electrode arrays for bioelectronic interfaces. In *Flexible and Printed Electronics Conference, CA, USA*, 2016.

[10] **Yasser Khan**, Mark Schadt, Mohit Garg, Qiong Gui, Paul Hart, Robert Welte, Stephen Cain, Bill Wilson, Zhanpeng Jin, Mark Poliks, Kanad Ghose, Steve Czarnecki, Frank Egitto, James Turner, and Ana Claudia Arias. Inkjet-printed sensors for wearable health monitoring. In *MRS Fall Meeting, Boston, MA, USA*, 2015. **Best Oral Presentation Award**.

[11] **Yasser Khan**, Claire M Lochner, Adrien Pierre, and Ana Claudia Arias. System design for organic pulse oximeter. In *Advances in Sensors and Interfaces (IWASI), 2015 6th IEEE International Workshop on*, pages 83–86. IEEE, 2015. doi: 10.1109/IWASI.2015.7184975. URL http://dx.doi.org/10.1109/IWASI.2015.7184975.

[12] **Y. Khan**, M. Garg, M. Schadt, Q. Gui, P. Hart, Z. Jin, M. Poliks, R. Welte, S. Czarnecki, F. Egitto, K. Ghose, J. Turner, and A. C. Arias. Interfacing printed sensors to conventional electronics for wearable sensor patch. In *Flexible and Printed Electronics Conference, CA, USA*, 2015.

[13] Amy Liao, Monica C Lin, Lauren C Ritz, Sarah L Swisher, David Ni, Kaylee Mann, **Yasser Khan**, Shuvo Roy, Michael R Harrison, Ana C Arias, Vivek Subramanian, David Young, and Michel M Maharbiz. Impedance sensing device for monitoring ulcer healing in human patients. In *Engineering in Medicine and Biology Society (EMBC), 2015 37th Annual International Conference of the IEEE*, pages 5130–5133. IEEE, 2015. doi: 10.1109/EMBC.2015.7319546. URL http://dx.doi.org/10.1109/EMBC.2015.7319546.

[14] **Yasser Khan**, Adrien Pierre, Claire Lochner, and Ana C. Arias. All-organic green light pulse oximeter for wearable medical sensing. In *MRS Fall Meeting, Boston, MA, USA*, 2014.

[15] **Yasser Khan**, Yaping Zhang, Muhammad Amin, A Bayraktaroglu, Tien Khee Ng, H Bağcı, J Phillips, and Boon S Ooi. Zno nanorods for simultaneous light trapping and transparent electrode application in solar cells. In *Photonics Conference (PHO), 2011 IEEE*, pages 619–620. IEEE, 2011. doi: 10.1109/PHO.2011.6110700. URL http://dx.doi.org/10.1109/PHO.2011.6110700.

[16] Hisham Al-Falih, **Yasser Khan**, Yaping Zhang, Damain Pablo San-Roman-Alerigi, Dongkyu Cha, Boon Siew Ooi, and Tien Khee Ng. Fabrication of tuning-fork based afm and stm tungsten probe. In *High Capacity Optical Networks and Enabling Technologies (HONET), 2011*, pages 190–192. IEEE, 2011. doi: 10.1109/HONET.2011.6149815. URL http://dx.doi.org/10.1109/HONET.2011.6149815.

[17] **Yasser Khan**, Josh Ballard, Yaping Zhang, Justin Alexander, Miles Larkin, and Boon Ooi. Facile method for fabricating reproducible tungsten probe tips with varying cone angles. In *International Conference on Materials for Advanced Technologies (ICMAT)*, 2011.

[18] **Yasser Khan** and John Randall. Wireless embedded control system for atomically precise manufacturing. In *Information Technology: New Generations (ITNG), 2011 Eighth International Conference on*, pages 965–969. IEEE, 2011. doi: 10.1109/ITNG.2011.165. URL http://dx.doi.org/10.1109/ITNG.2011.165.

Poster Presentations

[1] Md Farhad Hassan, Samiha Tasnim, Leikhang Xiong, Munia Ferdoushi, Mohammad Arfan, and **Yasser Khan**. Ml driven optical monitoring of stress through electrodermal activity. In *Soft Mechatronics and Wearable Systems, SPIE, Long Beach, California, USA*, 2024.

[2] **Yasser Khan**, Boris Murmann, and Zhenan Bao. Mentaid: A skin-like sensor system for decoding mental health. In *2020 eWEAR Annual Meeting, Stanford, CA, USA*, February 2020.

[3] Jonathan Ting*, Natasha Yamamoto*, **Yasser Khan***, Abhinav Gaikwad, and Ana Claudia Arias. Fully screen-printed nio thermistor arrays. In *Flexible Electronics Conference and Exhibition - 2018 FLEX, Monterey, CA, USA*, February 2018. **Best Poster Award.**

[4] **Yasser Khan**, Felippe Pavinatto, and Ana Claudia Arias. Flexible printed circuit board for wearable physiological monitoring. In *MRS Spring Meeting, San Francisco, CA, USA*, April 2014. **Nominated for Best Poster Award.**

[5] **Yasser Khan**, Adrien Pierre, Claire Lochner, and Ana Claudia Arias. Printed pulse oximeter for wearable medical sensor patch. In *NASCENT IAB Meeting, Austin, TX, USA.*, January 2014. **Best Poster Award**.

[6] **Yasser Khan**, Changxu Liu, Diego Molinari, Boon Ooi, and Andrea Fratalocchi. Energy harvesting in complex systems. In *Electrical Engineering Days, King Abdullah University of Science and Technology.*, February 2012. **Best Poster Award.**

[7] **Yasser Khan**, Josh Ballard, Justin Alexander, Miles Larkin, and Boon Ooi. Controllable electrochemical etching of tungsten stm tips. In *First WEP Research Poster Session, King Abdullah University of Science and Technology.*, January 2011. **Best Poster Award.**

[8] **Yasser Khan**, Yaping Zhang, Muhammad Amin, Tien Khee Ng, Jamie Phillips, Hakan Bagci, and Boon Ooi. Zno nanorods for simultaneous light trapping and transparent electrode application in solar cells. In *First Graduate Research Symposium, King Abdullah University of Science and Technology.*, May 2011. **Best Poster Award.**

Patents

[1] Ana Claudia Arias, Claire Lochner, Adrien Pierre, and **Yasser Khan**. Reflectance based pulse oximetry systems and methods, February 4 2020. US Patent 10,548,519.

[2] Michel Maharbiz, Vivek Subramanian, Ana Claudia Arias, Sarah Swisher, Amy Liao, Monica Lin, Felippe Pavinatto, **Yasser Khan**, Daniel Cohen, Elisabeth Leeflang, and others. Methods and apparatus for monitoring wound healing using impedance spectroscopy, November 5 2019. US Patent 10,463,293.

[3] Claire Meyer Lochner, Rachel Nancollas, Jacob Sadie, **Yasser Khan**, and Ana Claudia Arias. Flexible, non-invasive real-time hematoma monitoring system using near-infrared spectroscopy, May 3 2018. US Patent App. 15/852,366.

[4] **Yasser Khan**, Donggeon Han, Adrien Pierre, Jonathan Ting, Xingchun Wang, Claire M Lochner, and Ana C Arias. Printed all-organic reflectance oximeter array, November 28 2019. International Patent App. PCT/US20 19/033381.

[5] Yuxin Liu, Zhenan Bao, and **Yasser Khan**. Stretchable electrocardiogram (ecg) apparatuses, November 24 2022. US Patent App. 17/772,457.

Invited Talks

1. **May 2020, eWear Seminar, Stanford University:** *A low-cost, helmet-based, non-invasive ventilator for COVID-19.*
2. **January 2020, Catalyst Symposium on Mental Health, Stanford University:** *Mentaid: A skin-like sensor system for decoding mental health.*
3. **June 2019, eWear Seminar, Stanford University:** *Soft, skin-like, organic optoelectronic sensors for wearable oximetry.*
4. **December 2018, Kateeva:** *Wearable medical sensors enabled by printed bioelectronics and biophotonics.*
5. **March 2018, University of Southern California:** *Integration of printed sensors to flexible hybrid electronics for wearable health monitoring.*
6. **February 2018, Purdue University:** *Integration of printed sensors to flexible hybrid electronics for wearable health monitoring.*

Selected News Coverage

1. **December 2019, Medical Device Developments:** *Your heart on your sleeve.* [Link]
   Interview with Medical Device Developments magazine regarding materials for next-generation wearables.
2. **November 2018, Physics World:** *Flexible sensor maps blood oxygen levels.* [Link]
3. **November 2018, Berkeley News:** *Skin-like sensor maps blood-oxygen levels anywhere in the body.* [Link]
4. **December 2018, American Society of Mechanical Engineers:** *Oxygen-Mapping Sensor Could Improve Organ Transplants, Skin Grafts.* [Link]
5. **November 2018, The Engineer:** *Flexible oximeter maps blood-oxygen anywhere on the body.* [Link]
6. **March 2015, Daily Californian:** *Smart bandage shows early tissue damage not visible to the eyes.* [Link]
7. **March 2015, BBC News:** *Smart bandage to detect bedsores.* [Link]
8. **January 2015, Berkeley Graduate Division:** *Engineering Team Invents Affordable Medical Sensor.* [Link]
9. **March 2015, ACM Communications:** *'Smart Bandage' Detects Bedsores Before They Are Visible to Doctors.* [Link]
10. **December 2014, Berkeley News:** *Organic electronics could lead to cheap, wearable medical sensors.* [Link]
11. **May 2013, Photonics:** *Chaos Overcomes Order ... for Light Storage.* [Link]

Honors and Distinctions

Research Awards / Honors:

USC Zumberge Award	*May '24*
Google Research Award	*May '23*
Best Poster Award, Flex 2018 Conference, Monterey, CA, USA	*Feb '18*
Best Project Award, Systems On Nanoscale Information fabriCs (SONIC) Year 5 Annual Review Meeting, Urbana, IL, USA	*Oct '17*
Best Oral Presentation Award, MRS Fall Meeting, Boston, MA, USA	*Dec '15*
Best Poster Award, NASCENT IAB Meeting, UT Austin, TX, USA	*Jan '14*
Best Poster Award, EE – Photonics Track, Electrical Engineering Days, KAUST	*Feb '12*
Finalist, DOW Sustainability Innovation Student Challenge	*Sep '11*
Best Poster Award, First Graduate Research Symposium, KAUST	*May '11*
Best Poster Award, Winter Enrichment Period Research Poster Session, KAUST	*Jan '11*

Academic Awards / Honors:

EECS Departmental Fellowship, UC Berkeley	*Sep '13*
Academic Excellence Award, (Top 5% in Graduating Class), KAUST	*Dec '11*
KAUST Provost Award, (Top 15% in Matriculating Class), KAUST	*Nov '10*
KAUST Graduate Fellowship	*May '10*
Phi Kappa Phi, Honor Society, (Top 10% in Graduating Class), UT Dallas	*May '10*
Dean's List, All Semesters, (Top 10% in Erik Jonsson School of ECS), UT Dallas	*May '10*
Golden Key Honor Society, (Top 15% in School of ECS), UT Dallas	*Dec '09*
KAUST Discovery Scholarship	*Oct '08*
Academic Excellence Scholarship, UT Dallas	*Apr '08*
Undergraduate Scholarship for three years, OIC	*May '05*
Merit Scholarships, Education Board, Government of Bangladesh, (Top 1% in Graduating Class)	*Dec '01, '03, '05*

Technical skills

Fabrication and Characterization:

Fabrication: Dimatix, Ceradrop, Screen Printing, Automatic Film Applicator.

Microscopy: SEM - FEI Quanta 600, Confocal Microscopy, AFM, TEM.

Optical Characterization: UV-Vis, Raman and PL - Horiba, Ellipsometry.

Electrical Characterization: Cascade, B1500A Semiconductor Device Parameter Analyzer.

Software Skills:

Programming: C/C++, Python, Matlab.

Open-Source: MEEP, LAMMPS, Paraview, MSTM, Voro++, LaTeX, Git.

OS: Unix, Ubuntu, Windows.

Software Applications: Comsol, L-Edit, SEMulator3D.

Hardware Skills:

Prototyping and PCB: Eagle.

MCUs and MPUs: Arduino, Gumstix, MSP 430, Nordic nRF51.

Professional Activities

Reviewer, Nature Electronics, Nature Communications	*'14 – Present*
Reviewer, Proceedings of the National Academy of Sciences, PNAS	*'15 – Present*
Reviewer, Science Advances	*'19 – Present*
Reviewer, ACS Nano	*'19 – Present*
Reviewer, Advanced Optical Materials, Advanced Engineering Materials	*'19 – Present*
Reviewer, IEEE Sensors Journal, IEEE Sensors Letters, IEEE Transactions of Electron Devices	*'13 – Present*
Reviewer, AIP Advances	*'10 – Present*
Materials Research Society (MRS), Student Member	*'13 – Present*
Institute of Electrical and Electronics Engineers (IEEE), Student Member	*'06 – '10*
American Physical Society (APS), Student Member	*'09 – '10*

Relevant Graduate Courses

Semiconductor Devices: Integrated-Circuit Devices, Solid State Devices, Electronic and Optical Properties of Semiconductors.

Optoelectronics and Photonics: Semiconductor Optoelectronic Devices, Semiconductor Lasers and LEDs, Photonics, Advanced Topics in Wave Propagation.

Bioelectronics: Introductory Electronic Transducers Laboratory, Brain-Machine Interface Systems.

Biophotonics: Principles of Molecular and Cellular Biophotonics.

Teaching

Instructor, EE 599, Bioelectronics, USC	*Fall '24*
Instructor, ENGR 102, Freshman Academy, USC	*Fall '23*
Instructor, EE 599, Bioelectronics, USC	*Fall '22*
Lab / Content TA, EE 16A, Designing Information Devices and Systems I, UC Berkeley	*Fall '17*
Lab / Content TA, EE 16A, Designing Information Devices and Systems I, UC Berkeley	*Spring '17*
Lab TA, EE 306, Electronic and Optical Properties of Semiconductors, KAUST	*Fall '12*

References

Available upon request.

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