

Yasser Khan

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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

Ph.D. in Electrical Engineering and Computer Sciences

GPA 3.95/4.00, Concentration: Physical Electronics.

University of California, Berkeley, CA, USA

Dec '18



Dissertation: Wearable medical sensors enabled by printed bioelectronics and biophotonics.

Advisor: [Professor Ana Claudia Arias](#).

M.S. in Electrical Engineering

GPA 3.92/4.00, Concentration: Optoelectronics and Photonics.

KAUST, KSA

Dec '12



Thesis: Light management in optoelectronic devices with disordered and chaotic structures.

Advisor: [Professor Boon Ooi](#); Co-Advisor: [Professor Andrea Fratalocchi](#).

B.S. in Electrical Engineering

GPA 3.98/4.00, Summa Cum Laude, Concentration: Electronics.

University of Texas at Dallas, TX, USA

May '10



Senior Design Project: Wireless embedded control system for atomically precise manufacturing.

Faculty Advisor: [Professor Murat Torlak](#); Industry Advisor: [John Randall, PhD](#).

Experience

Assistant Professor of Electrical and Computer Engineering

University of Southern California, CA, USA

Jan '22–Present



Postdoctoral Scholar in Chemical Engineering

Advisor: [Professor Zhenan Bao](#); Co-Advisor: [Professor Boris Murmann](#).

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
- \$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

Honors and Distinctions

Research Awards / Honors:

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

Selected Publications

Please check [google scholar](#) for the most up-to-date publications list.

- [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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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*, Felipe 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](https://doi.org/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 Leeftang, Yasser Khan, Felipe 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1002/adma.201606206). URL <http://dx.doi.org/10.1002/adma.201606206>.
- [13] 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](https://doi.org/10.1002/admt.201901122). URL <http://dx.doi.org/10.1002/admt.201901122>.
- [14] 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](https://doi.org/10.1002/adfm.201802986). URL <http://dx.doi.org/10.1002/adfm.201802986>.
- [15] 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](https://doi.org/10.1038/nphoton.2013.108). URL <http://dx.doi.org/10.1038/nphoton.2013.108>. **Cover article. Media coverage: EurekaAlert!, nanowerk, Photonics.com, ScienceDaily, Phys.Org, and many more.**
- [16] 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](https://doi.org/10.1038/s41928-020-00510-8). URL <http://dx.doi.org/10.1038/s41928-020-00510-8>.
- [17] 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](https://doi.org/10.1177/24705470211000338). URL <http://dx.doi.org/10.1177/24705470211000338>.
- [18] **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](https://doi.org/10.1073/pnas.2116943118). URL <http://dx.doi.org/10.1073/pnas.2116943118>.
- [19] 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](https://doi.org/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.**

Updated: May 6, 2024