Stanford

Asir Intisar Khan

Ph.D. Student in Electrical Engineering, admitted Autumn 2018

Curriculum Vitae available Online

Bio

BIO

Asir Intisar Khan is a Ph.D. candidate in Electrical Engineering, Stanford University. His research focuses on the design, fabrication, and electro-thermal measurements of novel phase change superlattices and 2D heterostructures for high density, low-power memory both on the flexible and non-flexible platform. His research further expands into pushing these emerging memory technologies towards a novel and large design space for low-power brain-inspired computing. He is also interested in the prospect of these novel superlattices in thermoelectrics and energy harvesting.

HONORS AND AWARDS

- Stanford Graduate Fellowship, Stanford University (2020 - 2023)
- Departmental Fellowship, Electrical Engineering, Stanford University (2018-2019)

EDUCATION AND CERTIFICATIONS

- PhD Candidate, Stanford University , Electrical Engineering
- MS, Stanford University , Electrical Engineering (2021)
- M.Sc, Bangladesh University of Engineering and Technology , Electrical and Electronic Engineering (2018)
- B.Sc, Bangladesh University of Engineering and Technology , Electrical and Electronic Engineering (2016)

PERSONAL INTERESTS

Traveling, Cooking, Table Tennis

LINKS

- Personal Home Page: https://sites.google.com/site/asirintisarkhan16/
- http://poplab.stanford.edu: http://poplab.stanford.edu
- Google Scholar Profile: https://scholar.google.com/citations?hl=en&user=g42HyZwAAAAJ&view_op=list_works&sortby=pubdate

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

· Design, fabrication and characterization of superlattice-like Phase Change Memory (PCM) low power memory application: demonstrated ~8-10x reduction in the switching power compared to conventional PCM

· Interfacial thermoelectric engineering of PCM: Conceptualized and implemented the novel idea of incorporating interfacial thermoelectric heating in a conventional phase-change memory; Realization of ~2x reduction in the switching current density in conventional PCM using thermoelectric material

· Low power flexible nonvolatile memory: Fabrication and characterization of low power non-volatile memory on a flexible platform; achieved record-low switching current for flexible PCM to-date

· Low-power solid-state reflective display: Working on the optimization of low power solid-state reflective display using novel phase change heterostructures

As an aside, I have a general interest in quantum phenomena in nanostructures.

LAB AFFILIATIONS

- Eric Pop, Pop Lab (9/24/2018)

Publications

PUBLICATIONS

- **Unveiling the Effect of Superlattice Interfaces and Intermixing on Phase Change Memory Performance.** *Nano letters*
  Khan, A. I., Wu, X., Perez, C., Won, B., Kim, K., Ramesh, P., Kwon, H., Tung, M. C., Lee, Z., Oh, I., Saraswat, K., Asheghi, M., Goodson, et al
  2022
- **Ultralow-switching current density multilevel phase-change memory on a flexible substrate.** *Science (New York, N.Y.)*
  Khan, A. I., Daus, A., Islam, R., Neilson, K. M., Lee, H. R., Wong, H. P., Pop, E.
  2021; 373 (6560): 1243-1247
- **Fast-Response Flexible Temperature Sensors with Atomically Thin Molybdenum Disulfide.** *Nano letters*
  Daus, A., Jaikissoon, M., Khan, A. I., Kumar, A., Grady, R. W., Saraswat, K. C., Pop, E.
  2022
- **Ultra-low-energy programmable non-volatile silicon photonics based on phase-change materials with graphene heaters** *NATURE NANOTECHNOLOGY*
  Fang, Z., Chen, R., Zheng, J., Khan, A., Neilson, K. M., Geiger, S. J., Callahan, D. M., Moebius, M. G., Saxena, A., Chen, M. E., Rios, C., Hu, J., Pop, et al
  2022
- **Electro-Thermal Confinement Enables Improved Superlattice Phase Change Memory** *IEEE ELECTRON DEVICE LETTERS*
  Khan, A., Kwon, H., Chen, M. E., Asheghi, M., Wong, H., Goodson, K. E., Pop, E.
  2022; 43 (2): 204-207
- **Lateral electrical transport and field-effect characteristics of sputtered p-type chalcogenide thin films** *APPLIED PHYSICS LETTERS*
  Wahid, S., Daus, A., Khan, A., Chen, V., Neilson, K. M., Islam, M., Chen, M. E., Pop, E.
  2021; 119 (23)
- **Modeling and computation of thermal and optical properties in silicene supported honeycomb bilayer and heterobilayer nanostructures** *MATERIALS SCIENCE IN SEMICONDUCTOR PROCESSING*
  Noshin, M., Khan, A., Chakraborty, R., Subrina, S.
  2021; 129
- **Uncovering Thermal and Electrical Properties of Sb2Te3/GeTe Superlattice Films.** *Nano letters*
  Kwon, H., Khan, A. I., Perez, C., Asheghi, M., Pop, E., Goodson, K. E.
  2021
- **Two-Fold Reduction of Switching Current Density in Phase Change Memory Using Bi2Te3 Thermoelectric Interfacial Layer** *IEEE ELECTRON DEVICE LETTERS*
  Khan, A., Kwon, H., Islam, R., Perez, C., Chen, M. E., Asheghi, M., Goodson, K. E., Wong, H., Pop, E.
  2020; 41 (11): 1657–60

- **Flexible Low-Power Superlattice-Like Phase Change Memory** *2020 Device Research Conference (DRC)*
  Khan, A., Daus, A., Pop, E.
  2020: 1–1
- **Large temperature coefficient of resistance in atomically thin two-dimensional semiconductors** *Applied Physics Letters*
  Khan, A., Khakbaz, P., Brenner, K. A., Smithe, K., Mleczko, M. J., Esseni, D., Pop, E.
  2020; 116 (20)
- **Flexible Low-Power Superlattice-Like Phase Change Memory**
  Khan, A., Daus, A., Pop, E., IEEE
  IEEE.2020
- **Large Temperature Coefficient of Resistance in Atomically Thin 2D Devices** *IEEE Device Research Conference (DRC)*
  Khan, A., Brenner, K., Smithe, K., Mleczko, M., Pop, E.
  2019: 125–126
- **Thermal transport characterization of stanene/silicene heterobilayer and stanene bilayer nanostructures** *NANOTECHNOLOGY*
  Noshin, M., Khan, A., Subrina, S.
  2018; 29 (18): 185706
- **Impact of tensile strain on the thermal transport of zigzag hexagonal boron nitride nanoribbon: An equilibrium molecular dynamics study** *MATERIALS RESEARCH EXPRESS*
  Navid, I., Khan, A., Subrina, S.
  2018; 5 (2)
- **Stanene-hexagonal boron nitride heterobilayer: Structure and characterization of electronic property** *SCIENTIFIC REPORTS*
  Khan, A., Chakraborty, T., Acharjee, N., Subrina, S.
  2017; 7
- **Stanene-hexagonal boron nitride heterobilayer: Structure and characterization of electronic property.** *Scientific reports*
  Khan, A. I., Chakraborty, T., Acharjee, N., Subrina, S.
  2017; 7 (1): 16347
- **Thermal transport characterization of hexagonal boron nitride nanoribbons using molecular dynamics simulation** *AIP ADVANCES*
  Khan, A., Navid, I., Noshin, M., Subrina, S.
  2017; 7 (10)
- **Characterization of thermal and mechanical properties of stanene nanoribbons: a molecular dynamics study** *RSC ADVANCES*
  Khan, A., Paul, R., Subrina, S.
  2017; 7 (80): 50485–95
- **Automatic Bengali Number Plate Reader**
  Shahed, M., Udoy, M., Saha, B., Khan, A., Subrina, S., IEEE
  IEEE.2017: 1364–68
- **Thermal Transport in Defected Armchair Graphene Nanoribbon: A Molecular Dynamics Study**
  Noshin, M., Khan, A., Navid, I., Subrina, S., IEEE
  IEEE.2017: 2600–2603
- **Thermal transport in graphene/stanene heterobilayer nanostructures with vacancies: an equilibrium molecular dynamics study** *RSC ADVANCES*
  Khan, A., Paul, R., Subrina, S.
  2017; 7 (71): 44780–87
- **Impact of vacancies on the thermal conductivity of graphene nanoribbons: A molecular dynamics simulation study** *AIP ADVANCES*
  Noshin, M., Khan, A., Navid, I., Uddin, H., Subrina, S.
  2017; 7 (1)
- **Bangla Voice Controlled Robot for Rescue Operation in Noisy Environment**
  Bhattacharjee, A., Khan, A., Haider, M. Z., Fattah, S. A., Chowdhury, D., Sarkar, M., Shahnaz, C., IEEE
  IEEE.2016: 3284–88

- **Equilibrium Molecular Dynamics (MD) Simulation Study of Thermal Conductivity of Graphene Nanoribbon: A Comparative Study on MD Potentials** *ELECTRONICS*

  Khan, A., Navid, I., Noshin, M., Uddin, H., Hossain, F., Subrina, S.

  2015; 4 (4): 1109–24