Sagar Bhandari
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106 Central Loop Suite 208G, Slippery Rock, PA 16057

CURRENT POSITION

Slippery Rock University, Department of Physics and Engineering — Slippery Rock, PA
Assistant Professor — 2019- Present

PREVIOUS POSITION

Harvard University, School of Engineering and Applied Sciences — Cambridge, MA
Research Associate — 2015- Present

EDUCATION

Harvard University, School of Engineering and Applied Sciences — Cambridge, MA

- Ph.D. in Applied Physics — May 2015
  - Dissertation Title "Imaging Electron Flow in Graphene"
- M.Sc. in Applied Physics — May 2012

Trinity College — Hartford, CT

- B.Sc., Physics — 2009
- B.Sc., Electrical Engineering — 2009
- Graduated valedictorian of the class

RESEARCH GRANTS / FELLOWSHIPS

1.**National Science Foundation (NSF) Award of $80,000** through Center for Integrated Quantum Materials (CIQM) at Harvard University for "Undergraduate Lab to Demo Quantum Concepts at Slippery Rock University". Principal Investigator at Slippery Rock University.

RESEARCH EXPERIENCE

Slippery Rock University, Department of Physics and Engineering — Slippery Rock, PA
Low temperature Quantum Devices — 2019 - Present
Scanning Probe Microscopy

Center for Integrated Quantum Materials and Devices — Cambridge, MA
Collaborator — 2019 - Present

Harvard University, School of Engineering and Applied Sciences — Cambridge, MA
Research Associate/PhD, Supervisor: Prof. Robert M. Westervelt — 2009- 2019
Imaging electron flow in 2D materials using a liquid He cooled scanning probe microscope

- Imaged Andreev reflection in graphene device with superconducting contacts
- Imaged electron flow through collimating contacts in graphene device
- Imaged quantum dot formation in MoS_2 nanostructures

- Imaged electron flow in hBN-MoS_2-hBN device
- Imaged hole motion in graphene device
- Simulation of imaging hydrodynamic flow of electrons in graphene
- Implementation of machine learning algorithm to identify graphene

TEACHING EXPERIENCE

Slippery Rock University, Department of Physics and Engineering Slippery Rock, PA

Modern Physics I	2019, 2020
General Physics Lab I	2019, 2020
Intro to Electrical Engineering	2020
Advanced Physics Lab	2020
Modern Physics II	2020
Mathematical Methods in Physics	2020

Harvard University, School of Engineering and Applied Sciences Cambridge, MA

Teaching Assistant

Applied Physics 195 "Introduction of Solid State Physics" 2011

- Assisted in lectures and grading.
- Prepared and presented sections throughout the semester and two class lectures.

CONFERENCE TALKS / SEMINARS

1. Contributed Talk from Students at APS March meeting 2020 (Abstract accepted, Virtual Meeting), (In person conference cancelled due to Covid-19)

- Michael Zirpoli, "Signature of Viscous Electron Flow in Graphene Using a Scanning Probe Microscope", APS March Meeting 2020
- Andrew Smeltzer, "Imaging electrons at the nanoscale with a cooled scanning probe microscope", APS March Meeting 2020

2. **Abstracts accepted for Contributed talk at SRU Symposium for Student Research (Published in Digital booklet), 2020,** (Symposium cancelled due to Covid-19)

- Michael Zirpoli, "Signature of Viscous Electron Flow in Graphene Using a Scanning Probe Microscope"
- Robert Taylor, "Design and Construction of Scanning Probe Microscope Retrofitted to Tabletop Cryostat"
- Andrew Smeltzer "Design and Implementation of Cooled Scanning Probe Microscope"

3. Poster, S Bhandari "Low Cost Scanning Probe Microscope for Imaging Quantum Materials", NSF workshop "Enabling Quantum Leap", University of Pennsylvania, Sept 2019

4. Invited Talk, S. Bhandari “Imaging Electrons in 2D Materials”, Old Dominion University, Feb 2019

5. **Invited Talk**, S. Bhandari “Imaging Electrons in 2D Materials”, Union College, March 2019

6. Invited Talk, S. Bhandari “Imaging Electrons in 2D Materials”, University of North Florida, April 2019

7. Invited Talk, S. Bhandari “Imaging Electrons in 2D Materials”, Trinity College, Feb 2019

8. Invited Talk, S. Bhandari "Imaging Electrons in 2D Materials," UC Riverside, April 9, 2018

9. Invited Talk, S. Bhandari, K. Wang, K. Watanabe, T. Taniguchi, P. Kim and R.M. Westervelt, "Imaging Electron Flow in a Few Layer MoS2 Devices," Int. Conf. Physics of Semiconductors (ICPS 2016), Beijing, China, July 31 to Aug 5, 2016.

10. Contributed Talk, S. Bhandari, G.-H. Lee, K. Watanabe, T. Taniguchi, P. Kim and R. M. Westervelt, “Imaging electron flow in atomically thin materials”, Hybrid Quantum Systems (HQS), Miyagi Zao, Japan, Sep 10 - Sep 13, 2017.

11. Contributed Talk, S. Bhandari, G.-H. Lee, K. Watanabe, T. Taniguchi, P. Kim and R. M. Westervelt, “Imaging Andreev reflection under a magnetic field in graphene”, Low Temperature Physics Conference 28 (LT 28), Gothenburg, Sweden, Aug 8 - Aug 17, 2017.

12. Contributed Talk, S. Bhandari, G.-H. Lee, K. Watanabe, T. Taniguchi, P. Kim and R. M. Westervelt, “Imaging electron flow through collimating contacts in graphene”, Mesoscopic Transport and Quantum Coherence (QTC), Espoo, Finland, Aug 5-Aug 8, 2017.

13. Contributed Talk, S. Bhandari, G.-H. Lee, K. Watanabe, T. Taniguchi, P. Kim and R. M. Westervelt, “Imaging collimation of electron flow in graphene”, International Conference on Electronic Properties of Two-Dimensional Systems (EP2DS-22), Penn State, PA, July 31-Aug 4, 2017.

14. Contributed Talk, S. Bhandari, G.-H. Lee, K. Wang, K. Watanabe, T. Taniguchi, P. Kim and R.M. Westervelt, "Imaging Electron Motion in 2D Materials," 20th International Conference on Electron Dynamics in Semiconductors (EDISON20), Buffalo, NY, July 16-21, 2017.

15. Contributed Talk, S. Bhandari, G.-H. Lee, K. Wang, K. Watanabe, T. Taniguchi, P. Kim and R.M. Westervelt, "Imaging Electron Motion in Atomic Layer Systems," Quantum Materials and Devices Seminar, Harvard University, Sept.15, 2016.

16. Contributed Talk, S. Bhandari, G.-H. Lee, K. Watanabe, T. Taniguchi, P. Kim and R.M. Westervelt, "Imaging Electron Flow through Graphene in a Magnetic Field," Int. Conf. on Nanoscience and Technology (ICN+T 2016), Busan, Korea, Aug. 21-26, 2016.

17. Contributed Talk, S. Bhandari, GH. Lee, P. Kim and R.M. Westervelt, "Analysis of Scanned Probe Images for Magnetic Focusing in Graphene," Int. Conf. on Superlattices, Nanostructures and Nanodevices (ICSNN 2016), in Hong Kong, China, July 25-30, 2016.

18. Contributed Talk, S. Bhandari, GH. Lee, P. Kim and R.M. Westervelt, "Imaging Magnetic Focusing of Electrons in Graphene," Int. Conf. Graphene 2016, Genova, Italy, April 19-22, 2016.

19. Contributed Talk, S. Bhandari, GH. Lee, P. Kim and R.M. Westervelt, "Imaging Magnetic Focusing of Electrons in Graphene," Int. Conf. on Electronic Properties of Two-Dimensional Systems (EP2DS), 2015, Sendai, Japan, July 26-31, 2015.

20. Contributed Talk, S. Bhandari**,** R. M. Westervelt, "Low Temperature Scanning Capacitance Probe for Imaging Electron Motion", Low Temperature Physics Conference, Buenos Aires, Argentina, August 6-13, 2014.

PUBLICATIONS

1. **Sagar Bhandari,** Gil-Ho Lee, Kenji Watanabe, Takashi Taniguchi, Philip Kim, Robert M. Westervelt, *Imaging Andreev Reflection in Graphene,* Nano Letters, 20(7), pp 4890-4894, 2020

2. **Sagar Bhandari,** Mary Keenan, Gil-Ho Lee, Kenji Watanabe, Takashi Taniguchi, Philip Kim, Robert M. Westervelt, *Imaging the flow of holes from a collimating contact in Graphene,* Semiconductor Science and Technology, 35(9), 2020

3. **Sagar Bhandari**, Gil-Ho Lee, Kenji Watanabe, Takashi Taniguchi, Philip Kim, Robert M. Westervelt, *Imaging Electron Flow from Collimating Contacts in Graphene,* 2D Materials, 5(2), 2018

4. **Sagar Bhandari**, Ke Wang, Kenji Watanabe, Takashi Taniguchi, Phillip Kim, Robert M. Westervelt, *Imaging Quantum Dot Formation in MoS_2 Nanostructures*, Nanotech, 29(42), 2018

5. **Sagar Bhandari**, Ke Wang, Kenji Watanabe, Takashi Taniguchi, Phillip Kim, Robert M. Westervelt, *Imaging Electron Motion in Few Layer MoS_2 Device*, Journal of Physics: Conference Series, 864(1), 012031, 2017

6. **Sagar Bhandari**, Andrew Lin, Robert M. Westervelt, *Investigating the Transition Region of Scanned Probe Images of the Cyclotron Orbit in Graphene*, Journal of Nanoelectronics and Optoelectronics, 12(9), 952-955, 2017

7. **Sagar Bhandari**, Gil-Ho Lee, Philip Kim, Robert M. Westervelt, *Analysis of Scanned Probe Images for Magnetic Focusing in Graphene*, Journal of Electronic Materials, 46(7), 3837-3841, 2017

8. **Sagar Bhandari**, Robert Westervelt, *Imaging Electron Motion in Graphene*, Semiconductor Science and Technology, Vol. 32, No. 2, Special Issue on Hybrid Quantum Materials and Devices, 2017

9. **Sagar Bhandari**, Gil-Ho Lee, Anna Klales, Kenji Watanabe, Takashi Taniguchi, Eric Heller, Phillip Kim, Robert Westervelt, *Imaging Cyclotron Orbits of Electrons in Graphene*, Nano Letters, 2016, 16(3), pp 1690-1694

10. Estelle Kalfon-Cohen, **Sagar Bhandari**, Robert M. Westervelt, and David C. Bell. *Electronic Properties of TEM-Sculpted Structure in Graphene*, Microscopy and Microanalysis 19, no. S2, 1940-1941 (2013).

11. **Sagar Bhandari,** Robert M. Westervelt. *Low Temperature Scanning Capacitance Probe for Imaging Electron Motion*, 2014, J. Phys.: Conf. Ser. 568.

12. Weili Wang, **Sagar Bhandari**, Wei Yi, Efthimios M. Kaxiras, Robert M. Westervelt. *Direct Imaging of Atomic Scale Ripples in Graphene.* 2012. Nano Lett. 12 (5).

13. David Branning, **S. Bhandari**, Mark Beck. *Low-Cost coincidence-counting electronics for undergraduate quantum optics,* AJP 77(7): 667-670, 2009.

14. **Sagar Bhandari**, Prashanna Gautam, David J. Ahlgren. *Implementation of RF communication with TDMA algorithm in swarm robots*, TEPR