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Education and Training

B.S., Animal Science, <i>summa cum laude</i> , North Carolina A&T University	2006
Ph.D., Cell and Molecular Biology, University of Pennsylvania	2012
Postdoctoral Fellow, Neuroscience, Cornell University	2012 – 2014
Postdoctoral Fellow, Neuroscience, University of Pennsylvania	2014 – 2018

Positions

University of Pennsylvania

Mitchell J. and Margo Krody Blutt Presidential Assistant Professor of Biology	2018 –
Member of Mahoney Institute for Neuroscience	2018 –
Member of mindCORE	2018 –

Awards and Honors

Phi Kappa Phi Honor Society	2006
Golden Key International Honor Society	2006
Gloria Twine Chisum Fellowship, University of Pennsylvania	2006
Society for Developmental Biology Award	2011
Tom Kadesch Prize in Genetic Research	2012
NIH K12 IRACDA Postdoctoral Fellowship	2014
Burroughs Wellcome Fund PDEP Postdoctoral Fellowship	2015
Burroughs Wellcome Fund Collaborative Research Travel Grant	2016
Rising Stars in Biomedical, M.I.T.	2017
NIH K99/R00 Pathway to Independence Award	2017
BRAINS Fellowship, NIH/University of Washington	2018
NIH Mitchell Max Award for Pain Research	2018
Mitchell J. Blutt and Margo Krody Blutt Presidential Endowed Chair	2018

Peer-reviewed publications

1. **Ishmail Abdus-Saboore***, Vincent P. Mancuso*, John I. Murray, Katherine Palozola, Carolyn Norris, David Hall, Kelly Howell, Kai Huang, Meera V. Sundaram. Notch and Ras promote sequential steps of excretory tube development in *C.elegans*. *Development* 138, 3545–3555 (2011).
2. **Ishmail Abdus-Saboore**, Craig Stone, John I. Murray, Meera Sundaram. The Nkx5/Hmx homeodomain protein MLS-2 is required for proper tube cell shape in the *C.elegans* excretory system. *Developmental Biology* 366, 298–307 (2012).

3. Alexander Fleischmann, **Ishmail Abdus-Saboor**, Atef Sayed, Benjamin Shykind. Functional interrogation of an odorant receptor locus reveals multiple axes of transcriptional regulation. *PLoS Biology* 11(5):e1001568 (2013).
4. **Ishmail Abdus-Saboor**, Muhammad Al-Nufal, Maha Agha, M. Ruinart de Brimont, Alexander Fleischmann, Benjamin Shykind. An expression refinement process ensures singular odorant receptor gene choice. *Current Biology* 26, 1083–90 (2016).
5. Lian Cui*, Xuerong Miao*, Lingli Liang, **Ishmail Abdus-Saboor**, William Olson, Michael Fleming, Minghong Ma, Yuanxiang Tao, Wenqin Luo. Identification of early RET+ deep dorsal spinal cord interneurons in gating pain. *Neuron* 91, 1–17 (2016).
6. William Olson, **Ishmail Abdus-Saboor***, Lian Cui*, Justin Burdge, Tobias Raabe, Minghong Ma, Wenqin Luo. Sparse genetic tracing reveals regionally specific functional organization of mammalian nociceptors. *eLife* 6:e29507 (2017).
7. **Ishmail Abdus-Saboor***, Nathan Fried*, Mark Lay, Kathryn Swanson, Justin Burdge, Jessica Jones, Peter Dong, Weihua Cai, Xinying Guo, Yuan-Xiang Tao, Roman Fischer, John Bethea, Minghong Ma, Xinzhong Dong, Long Ding, Wenqin Luo. Development of a mouse pain scale using sub-second behavioral mapping and statistical modeling. *Cell Reports* 28, 1623 – 1634 (2019).
8. Saumitra Pitake, Leah Middleton, **Ishmail Abdus-Saboor**, Santosh K Mishra. Inflammation induced sensory nerve growth and pain hypersensitivity requires the N-type calcium channel Cav2.2. *Frontiers in Neuroscience* 13, 1 – 13 (2019).
9. Heather L. Rossi, Lily Pachanin, William Foster, Saumitra Pitake, Jennifer Gibbs, Brian Schmidt, Claire Mitchell, **Ishmail Abdus-Saboor**. Evoked and spontaneous pain assessment in a dental pulp injury model. *Scientific Reports* 10:2759 (2020).
10. Jessica Jones*, William Foster*, Colin Twomey*, Justin Burdge, Jessica Wojick, Osama Ahmed, Talmo Pereira, Gregory Corder, Joshua Plotkin, **Ishmail Abdus-Saboor**. A machine-vision approach for automated pain measurement at millisecond timescales. *bioRxiv* (2020).
11. Andre Touissant, William Foster, Jessica Jones, Samuel Kaufmann, Meghan Wachira, Bobby Hughes, Nathan Fried, Mathieu Wimmer, **Ishmail Abdus-Saboor**. A rat pain scale built with fast imaging, statistical reduction, and machine learning reveals multigenerational differences in sensitivity to morphine. (in preparation)

Invited reviews

12. **Ishmail Abdus-Saboor**, Alexander Fleischmann, Benjamin Shykind. Setting limits: maintaining order in a large gene family. *Transcription* 5:e28978(2014).
13. Melanie Schaffler, Leah Middleton, **Ishmail Abdus-Saboor**. Mechanisms of tactile sensory phenotypes in autism: current understanding, and future directions for

research. *Current Psychiatry Reports* 21:134, 1-10 (2019).

14. Nathan Fried, Alexander Chamesian, Mark Zylka, **Ishmail Abdus-Saboer**. Improving pain assessment in mice and rats with advanced videography and computational approaches. *Pain* (in press).

Book chapters

15. **Ishmail Abdus-Saboer**, Wenqin Luo. Measuring mouse somatosensory reflexive behaviors with high-speed videography, statistical modeling, and machine learning. Contemporary approaches to the study of pain: from molecules to neural networks. (Ed. Rebecca Seal) *Springer Nature Neuromethods*, 2020 (under review)

Grant Support

Current

- 9/17 – 8/21 NIH/NIDCR K99/R00 Pathway to Independence Award (DE026807)
Determining the functions of molecularly defined populations of nociceptors in spinal and dental pain.
\$955,440 total costs
Role: PI, 75%
- 12/18 – 12/20 Research Supplement to R00 Award (DE026807)
\$161,115 total costs

Pending

- 9/20 – 8/25 NIH/NINDS R01
Automated identification of pain behavioral signatures in genetically diverse mice with divergent pain sensitivity.
\$2,672,075 total costs
Role: PI
- 9/20 – 8/23 NIH/NINDS R01
Genetic mapping of novel murine pain phenotypes.
\$1,231,142 total costs
Role: MPI, Co-MPI, Wade Berrettini, Penn.
- 9/20 – 8/22 NIH/NIAID R21
*Investigating the manipulation of host sensory neuronal circuitry by *B. burgdorferi*.*
\$351,117 total costs
Role: PI, Co-I: Dustin Brisson, Penn. *resubmission
- 9/20 – 8/23 Rita Allen Foundation Award in Pain
Discovering behavioral signatures of pain at millisecond timescales.
\$150,000 direct costs
Role: PI
- 9/20 – 8/21 IASP Collaborative Research Grant
Machine learning behavioral assessment of pain state in a clinically

relevant arthritis model.

\$15,000 direct costs

Role: Lead PI

Co-PIs – Victoria Abairra, Rutgers; Ewan Smith; Cambridge

Completed

9/15 – 8/18

Burroughs Wellcome Fund Postdoctoral Enrichment Program
Defining the neural mechanisms mediating crosstalk between touch and pain.

\$60,000 direct costs

Role: PI

6/16 – 12/17

Burroughs Wellcome Fund Collaborative Research Travel Grant
Optogenetic and brain imaging investigation of pain neural circuitry.

\$8,000 direct costs

Role: PI, Co-PI: Jin Lee, Stanford

9/14 – 7/17

NIH IRACDA Postdoc Fellowship (K12 GM081295)

Dissect neural mechanisms underlying the crosstalk between touch and pain.

\$190,488 total costs

2009 – 2011

NIH Pre-Doctoral Training Program in Genetics (T32 GM008216)

Invited Research Talks

Invited Talks Prior to Joining Penn Faculty

1. Society for Developmental Biology Meeting, Phila., PA 6/3/11
2. International *C.elegans* Meeting, Los Angeles, CA 6/26/11
3. Penn Cell and Molecular Biology Graduate Group Annual Symposium 10/11/11
4. Penn Department of Genetics Annual Symposium 11/28/12
5. 2nd International Symposium on Olfaction, Paris 9/19/13
6. Virginia Tech University, Department of Biochemistry 1/13/16
7. Rutgers University Camden, Department of Biology 3/10/16
8. Bucknell University, Department of Biology 10/3/16
9. Penn Dental School Levy Series 10/27/16
10. Mount Holyoke College, Department of Biological Sciences 11/8/16
11. Swarthmore College, Department of Biology 11/30/16
12. Rutgers University Camden, Department of Biology 1/19/17
13. Syracuse University, Department of Biology 3/10/17
14. Haverford College, Department of Biology 4/3/17
15. Society for Neuroscience Meeting 11/11/17
16. Temple University, Center for Substance Abuse Research 12/7/17
17. Johns Hopkins University School of Medicine, Department of Pharmacology 12/12/17
18. University of Pennsylvania, Department of Oral Surgery & Pharmacology 12/14/17
19. University of Pennsylvania, Department of Biology 1/11/18
20. New York University School of Dental Medicine, Department of Oral Surgery 2/7/18
21. Duke University School of Medicine, Department of Pharmacology 2/20/18
22. Bryn Mawr College, Chemistry Colloquia Series 4/16/18

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| 23. Meharry Medical College, Department of Biochemistry and Cancer Biology | 5/2/18 |
| 24. Vanderbilt University School of Medicine, <u>Emerging Scholars Lecture</u> | 5/3/18 |
| 25. Rockefeller University, Sense to Synapse Conference | 5/12/18 |
| 26. Annual NIH Pain Consortium Symposium | 5/31/18 |

Local/Regional Invited Talks as Faculty

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| 27. University of Pennsylvania, mindCORE Seminar Series | 9/4/18 |
| 28. Mid-Atlantic Pharmacology Society Meeting, Philadelphia, PA | 9/27/18 |
| 29. University of Pennsylvania, Department of Biology Retreat | 10/4/18 |
| 30. University of Pennsylvania, Center for Neurobiology and Behavior Seminar | 10/26/18 |
| 31. St. Joseph's University, Department of Biology | 11/14/18 |
| 32. Fox Chase Cancer Center, Molecular Therapeutics Department | 6/20/19 |
| 33. LaSalle University, Department of Biology | 10/1/19 |
| 34. University of Pennsylvania, Psychology Colloquium Series | 12/2/19 |
| 35. University of Pennsylvania, Dermatology Research Seminar Series | 1/14/20 |
| 36. Temple University, Neuroscience Seminar Series | 2/12/20 |
| 37. Rowan University, Molecular and Cellular Biosciences Seminar Series | 2/28/20 |

Webinar Invited Talks as Faculty

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| 38. Pain Research Forum; moderated by Cheryl Stucky (Wisconsin) | 3/24/20 |
| 39. Duke University School of Medicine; U01 Pain Project Team seminar | 6/8/20 |
| 40. Neuro Zoom Research Talks; organizer: Aaron Gitler (Stanford);
organizer: Zilong Qiu (Institute of Neuroscience, Chinese Academy of Sciences) | 7/6/20 |
| 41. NIH Early Career Investigators in Addiction Neuroscience | 8/12/20 |

National Invited Talks as Faculty

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| 42. University of California Santa Cruz, Dpt. of Molecular/Cell/Developmental Bio. | 1/14/19 |
| 43. North Carolina A&T University, Department of Biology | 1/23/19 |
| 44. University of Washington, Neuroscience Seminar Series | 3/14/19 |
| 45. University of Maryland Baltimore County, Dpts. of Bio/Chem. & Biochemistry | 5/8/19 |
| 46. University of Illinois at Chicago, Integrative Neuroscience Seminar Series | 9/26/19 |
| 47. University of Texas at Dallas, School of Behavioral and Brain Sciences | 11/7/19 |
| 48. Keystone Symposium, Pain: Aligning the Target, Colorado | 2/3/20 |
| 49. <u>Marie M. Daly Lecture</u> , New York University School of Medicine | <i>cancelled - COVID19</i> |
| 50. University of Chicago, Biochemistry/Molecular Biophysics | <i>cancelled - COVID19</i> |
| 51. University of Michigan, Molecular/Cell/Developmental Biology | <i>cancelled - COVID19</i> |
| 52. Duke University School of Medicine, Pain Seminar Series | 8/27/20 |
| 53. Next Generation Pain Therapeutics Meeting, Texas | 9/17/20 |
| 54. University of Texas San Antonio, Neuroscience Seminar Series | 11/11/20 |
| 55. University of Rochester, Department of Pharmacology and Physiology | 12/10/20 |
| 56. <u>Keynote Speaker</u> , Lehigh Valley Molecular/Cell Biology Society Meeting | 4/21 |

International Invited Talks as Faculty

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| 57. Gordon Conference on Molecular and Cellular Neurobiology, Hong Kong | 7/3/2018 |
| 58. Gordon Conference on Molecular and Cellular Neurobiology, Hong Kong | 7/2/2022 |

Educational Mission to the University of Pennsylvania:

BIOL 221: Molecular Biology and Genetics. 50%, 130 students. Spring 2019.

BIOL 221: Molecular Biology and Genetics. 50%, 150 students. Spring 2020.

Additional Penn course lectures

NGG 588: Topics in Translational Neuroscience, Spring 2020.

Summer High School Program's Neuroscience Research Academy, Summer 2019.

Summer High School Program's Biomedical Research Academy, Summer 2019.

Graduate Group Memberships:

Biology Graduate Group	2018 – present
Cell and Molecular Biology Graduate Group	2018 – present
Neuroscience Graduate Group	2018 – present
Pharmacology Graduate Group	2018 – present

Research Advising: (*denotes URM)

Predoctoral Students

*Melanie Schaffler. Neuroscience PhD student. 2018 – present.

Leah Middleton. Neuroscience PhD student. 2018 – present.

- 2020: Selected into North American Pain School (NAPS)

Justin Burdge. Biology PhD student. 2020 – present.

Postdoctoral Fellows

Saumitra Pitake, 2018 – 2020.

Heather Rossi, 2018 – present.

Undergraduates

*Migyana Thomas, 2018 –2019

Justin Burdge, 2018 –2019, (HSoc). Currently Biology PhD student in the lab.

Emma Lu, 2019, (Biology)

Lucie Pham, 2019 – present, (Biology)

*Justin Arnold, fall 2019 – present, (Biological Basis of Behavior)

Samuel Kaufmann, 2019 – present, (Biology)

- 2019: Benjamin Franklin Scholars Summer Grant
- 2019: Pincus-Magaziner Family Undergraduate Research and Travel Fund Grant
- 2020: Benjamin Franklin Scholars Summer Grant

Summer Interns from other Universities

Isabella Succi (St. Joseph's), 2019.

*Syphane Gibbs (NCAT), 2019. (SUIP). Beginning PhD in Pharmacology at UVA.

*Racquel Amadi (Xavier), 2019. (DAPPG)

*Camille Harrison (NCAT), 2020 (SUIP)

High School Students

*Mariatu Fayia, summer 2019 (SAS Penn LENS intern)

Service

Professional Service

Ad hoc Reviewer (Journals)

2017 – Neuroscience Letters
 2017 – PLoS One
 2018 – Molecular Pain
 2019 – eLife
 2019 – eNeuro
 2020 – Neuroscience
 2020 – Journal of Neuroscience
 2020 – Pain

Ad hoc Grant Reviewer

9/2018 Research Grants Council of Hong Kong
 8/2019 Burroughs Wellcome Fund Graduate Diversity Enrichment Program
 5/2020 Department of Defense/Army Research Office, Neurophysiology of Cognition
 6/3/2020 Study Section: NIH/NINDS, F99/K00 Blueprint Diversity Specialized
 Predoctoral to Postdoctoral Advancement in Neuroscience

Service to the University of Pennsylvania

Biology Department

Recruitment Day Chair for Ph.D. admissions 2020
 Seminar Committee 2020 –
 Co-Director, Mentoring Circle Program for underrepresented students 2018 – 2020

School of Arts and Sciences

Member, Dean Fluharty’s Committee for “*Mapping the Mind*” 2019 – 2020

Graduate Student Qualifying Exam and/or Thesis Advisory Committees

Brandon Bastien, Neuroscience Graduate Group. 2020 – present
 Jessica Wojick, Biology Graduate Group, 2020
 Melina Gyparaki, Biology Graduate Group. 2019 – present
 Bishwas Sharma, Biology Graduate Group. 2019 – present
 Lily See, DSc.D. program, 2019 – present
 Luigim Cifuentes, Neuroscience Graduate Group. 2019
 Yongjun Li, Biology Graduate Group, 2019
 Linyang Ju, Biology Graduate Group, 2019

Public Outreach

Podcast Interview, *Penn Science Policy and Diplomacy Group* 2020
 Podcast Interview, *UCSF Carry the One Radio* 2020
 Session Chair at Keystone Symposium Pain Meeting:
 “*Inclusivity and Diversity in the Field: What Works and How to Do Better*” 2020
 Feature Interview for middle school book project “*Healthy NewsWorks*” 2020
 Speaker for mindCORE event, “*Beyond the CV: Stories from Faculty*” 2020
 Panelist, Postdoc Association (BPP) event, “*Pursuing an Academic Career*” 2020
 Panelist for mindCORE event, “*Navigating the academic job market*” 2019
 Speaker, Penn Neuroscience “*Public Lecture on Pain*” 2019
 Abdus-Saboor lab Science Day for 25 elementary students in West Philly 2019
 Panelist, Center for Teaching/Learning “*Workshop on Inclusive Teaching*” 2019
 Research Seminar Speaker for SUIP underrepresented minority interns 2019
 Research Talk, ABRCMS Biomedical Research Conference, California 2019

Speaker, SMASH STEM program for high school minority students	2018
Panelist, Lasalle University STEM underrepresented minority day	2018
Invited Research Seminar, Penn Neuroscience Honors Society	2018

Media Coverage and Feature Stories

1. Stephanie Stahl, 2018. "From Central High School to His Own Lab, Penn Scientist Focused on Finding Better Treatments for Pain." *CBS Local News TV Special*.
2. Marla Vacek Broadfoot, 2018. "How early STEM program and mentors paved the way for a career in science." *Burroughs Wellcome Fund Feature Article*.
3. Gregory Richter, 2018. "PennPORT (al) into a Thriving Science Career." *Penn Medicine News*.
4. Katherine Baillie, 2019. "The Science of Sensations" *Penn Today*.
5. Cell Press, 2020. "100 inspiring black scientists in America."

Scientific Society Memberships

Society for Neuroscience	2013 – present
International Association for the Study of Pain	2018 – present