

## *Curriculum Vitae*

### **Ishmail Abdus-Saboor**

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### **Personal**

Born May 19, 1984 in Philadelphia, PA, USA.

### **Education and Training**

2014–2018 Postdoctoral Fellow, Neuroscience, University of Pennsylvania  
Advisor: Dr. Wenqin Luo  
2012–2014 Postdoctoral Fellow, Neuroscience, Weill Cornell Medicine  
Advisor: Dr. Benjamin Shykind  
2012 Ph.D. in Cell & Molecular Biology, University of Pennsylvania  
Advisor: Dr. Meera Sundaram  
2006 B.S. in Animal Science, North Carolina A&T State University, *summa cum laude*  
Advisor: Dr. Mulumebet Worku  
2005 Summer Research Internship, Department of Cell & Developmental Biology,  
University of Pennsylvania. Advisor: Dr. Glenn Radice

### **Appointments**

2021– Principal Investigator, Zuckerman Mind Brain Behavior Institute, Columbia University  
2021– Assistant Professor, Biological Sciences, Columbia University  
2018–2021 Mitchell & Margo Blutt Presidential Assistant Professor, University of Pennsylvania

### **Awards, Honors, and Fellowships**

2020 Rita Allen Foundation Scholar in Pain Award  
2018 NIH Mitchell Max Award for Pain Research  
2018 Mitchell J. Blutt and Margo Krody Blutt Presidential Endowed Chair  
2017 NIH K99/R00 Pathway to Independence Award  
2017 Rising Stars in Biomedical, Massachusetts Institute of Technology  
2015 Burroughs Wellcome Fund PDEP Postdoctoral Fellowship  
2014 NIH IRACDA Postdoctoral Fellowship, University of Pennsylvania  
2012 Tom Kadesch Prize in Genetic Research, University of Pennsylvania  
2011 Society for Developmental Biology Award  
2009 NIH Genetics Training Grant, University of Pennsylvania  
2006 Gloria Twine Chisum Fellowship, University of Pennsylvania  
2005 *Phi Kappa Phi*, North Carolina A&T State University  
2005 Golden Key International Honor Society, North Carolina A&T State University

### **Editorial Board Service**

2020– Editorial Advisory Board, *Cell Reports*  
 2020– Reviewing Editor, *eLife*

## Publications

### Primary Research Articles (corresponding author denoted with asterisk)

17. Toussaint A., Foster W., Jones J.M., Kaufmann S., Wachira M., Hughes R., Bongiovanni A.R., Famularo S.T., Dunham B., Schwark R., Fried N.T., Wimmer M., **Abdus-Saboer I.\*** Chronic paternal morphine exposure increases sensitivity to morphine-derived antinociception. (in preparation)
16. Jones J.M., Foster W., Twomey C.R., Burdge J., Ahmed O.M., Pereira T.D., Wojick J.A., Corder G., Plotkin J.B., **Abdus-Saboer I.\*** A machine-vision approach for automated pain measurement at millisecond timescales. *eLife* 9:e57258 (2020).
15. Rossi H.L., See L.P., Foster W., Pitake S., Gibbs J., Schmidt B., Mitchell C.H., **Abdus-Saboer I.\*** Evoked and spontaneous pain assessment in a dental pulp injury model. *Scientific Reports* 17;10(1):2759 (2020).
14. Pitake S., Middleton L.J., **Abdus-Saboer I.**, Mishra S.K. Inflammation induced sensory nerve growth and pain hypersensitivity requires the N-type calcium channel Cav2.2. *Front Neurosci.* 19;13:1009 (2019).
13. **Abdus-Saboer I.**, Fried N.T., Lay M., Burdge J., Swanson K., Fischer R., Jones J., Dong P., Cai W., Guo X., Tao Y.X., Bethea J., Ma M., Dong X., Ding L., Luo W. Development of a mouse pain scale using sub-second behavioral mapping and statistical modeling. *Cell Reports* 6;28(6):1623-1634 (2019).
12. Olson W., **Abdus-Saboer I.**, Cui L., Burdge J., Raabe T., Ma M., Luo W. Sparse genetic tracing reveals regionally specific functional organization of mammalian nociceptors. *eLife* 12;6:e29507 (2017).
11. Cui L., Miao X., Liang L., **Abdus-Saboer I.**, Olson W., Fleming M.S., Ma M., Tao Y.X., Luo W. Identification of early RET+ deep dorsal spinal cord interneurons in gating pain. *Neuron* 91, 1–17 (2016).
10. **Abdus-Saboer I.**, Al Nufal M.J., Agha M.V., Ruinart de Brimont M., Fleischmann A., Shykind B.M. An expression refinement process ensures singular odorant receptor gene choice. *Current Biology* 26, 1083–90 (2016).
9. Fleischmann A., **Abdus-Saboer I.**, Sayed A., Shykind B. Functional interrogation of an odorant receptor locus reveals multiple axes of transcriptional regulation. *PLoS Biology* 11(5):e1001568 (2013).

8. **Abdus-Saboer I.**, Stone C.E., Murray J.I., Sundaram M.V. 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).
7. **Abdus-Saboer I.**, Mancuso V.P., Murray J.I., Palozola K., Norris C., Hall D.H., Howell K., Huang K., Sundaram M.V. Notch and Ras promote sequential steps of excretory tube development in *C.elegans*. ***Development*** 138, 3545–3555(2011).

#### Reviews & Protocols

6. Inclan-Rico J.M., Kim B.S., **Abdus-Saboer I.\*** Beyond somatosensation: Mrgprs in mucosal tissues. ***Neuroscience Letters*** (in revision)
5. Burdge J., Fried N., **Abdus-Saboer I.\*** Using high-speed videography to construct a mouse pain scale. ***Star Protocols*** (in press)
4. Fried N.T., Chamesian A., Zylka M.J., **Abdus-Saboer I.\*** Improving pain assessment in mice and rats with advanced videography and computational approaches. ***Pain*** 161(7):1420-1424 (2020).
3. Schaffler M.D., Middleton L.J., **Abdus-Saboer I.\*** Mechanisms of tactile sensory phenotypes in autism: current understanding, and future directions for research. ***Current Psychiatry Rep.*** 5;21(12):134 (2019).
2. **Abdus-Saboer I.**, Fleischmann A., Shykind B. Setting limits: maintaining order in a large gene family. ***Transcription*** 5:e28978 (2014).

#### Book Chapters

1. **Abdus-Saboer I.**, Luo W. Measuring mouse somatosensory reflexive behaviors with high-speed videography, statistical modeling, and machine learning. Book Title: Contemporary approaches to the study of pain: from molecules to neural networks. (Ed. Rebecca Seal) ***Springer Nature Neuromethods***, 2021 (in press)

#### **Grant Support**

##### **Current**

- |                 |   |
|-----------------|---|
| 9/2020 – 8/2023 | Rita Allen Foundation Scholar in Pain Award<br>“Discovering behavioral signatures of pain at millisecond timescales.”<br>\$150,000 direct costs<br>Role: PI   |
| 9/2017 – 8/2021 | NIH K99/R00 Pathway to Independence Award (DE026807)<br>“Determining the functions of molecularly defined populations of nociceptors in spinal and dental pain.”<br>\$1,116,555 total costs<br>Role: PI |

**Pending**

9/2021 – 8/2026 NSF National Artificial Intelligence (AI) Research Institutes  
 “AI Institute: Biology Communities Powered by Full-Stack AI”  
 \$550,000 total costs to I.A.S.  
 Role: co-PI, Lead PI: Pietro Perona, Caltech

**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.  
 Funding covered full salary, travel, research supplies.

2009 – 2011 NIH Pre-Doctoral Training Program in Genetics (T32 GM008216)  
 Funding covered full stipend and tuition.

**Invited Research Talks**

78. Gordon Conference, Molecular and Cellular Neurobiology, California	7/25/22
77. Gordon Conference, Amygdala Function in Emotion, Cognition and Disease, Spain	7/12/21
76. Gordon Conference, Neurotrophic Mechanisms, Rhode Island	6/1/21
75. Salk Institute for Biological Sciences, Thursday Seminar Series	4/8/21
74. Williams College, Class of 1960 Scholar Speaker Series	3/31/21
73. University of Southern California, Neurobiology Seminar Series	3/22/21
72. George Washington University, IBS Neuroscience Seminar Series	3/11/21
71. University College London, Gatsby Computational Neuroscience Series	3/5/21
70. University of Chicago, Neuroscience Seminar Series	2/23/21
69. Duke University, Department of Neurobiology Seminar Series	2/16/21
68. Allen Institute for Brain Science, Black History Month Seminar Series	2/9/21
67. Middlebury College, Neuroscience Seminar Series	2/5/21
66. New York University School of Medicine, Marie Daly Speaker Series	1/26/21
65. Boston College, Behavioral Neuroscience Seminar Series	1/20/21
64. University of California San Diego, Neuroscience Seminar Series	1/12/21
63. Northeastern University, Biology Colloquium	12/7/20
62. Washington University in St. Louis, Anesthesiology Research Seminar Series	12/1/20
61. Weill Cornell Medicine, Frontiers in Neuropsychiatry Seminar Series	11/24/20
60. University of Pittsburgh & Carnegie Mellon University, Center for the Neural Basis of Cognition, Early Career Research Seminar Series	11/18/20

59. UT Health San Antonio, Dpt of Pharmacology & Center for Biomedical Neuroscience	11/11/20
58. Johns Hopkins University, Department of Biology Seminar Series	11/5/20
57. University of Iowa, Neuroscience Institute Seminar Series	10/30/20
56. Neuromatch Meeting, Keynote Talk	10/28/20
55. University of Michigan, Department of Molecular, Cell, Developmental Biology	10/16/20
54. Johns Hopkins University, Department of Biochemistry and Molecular Biology	10/12/20
53. Columbia University, Zuckerman Institute, Breakthroughs in Neuroscience Series	9/29/20
52. National Institutes of Health, Animal Genetics Consortium	9/24/20
51. Drexel University, Department of Neurobiology and Anatomy Seminar Series	9/23/20
50. Georgetown University, Department of Pharmacology and Physiology	9/10/20
49. National Institutes of Health, Early Career Investigators in Addiction Neuroscience Series	8/12/20
48. Johns Hopkins University, Department of Pharmacology & Molecular Sciences	7/22/20
47. Stanford University & Chinese Academy of Sciences; Neuro Zoom	7/6/20
46. University of Virginia, Neuroscience Department, <u>Inaugural Juneteenth Lecture</u>	6/15/20
45. Pain Research Forum; moderated by Cheryl Stucky, Wisconsin	3/24/20
44. Rowan University, Molecular and Cellular Biosciences Seminar Series	2/28/20
43. Temple University, Neuroscience Seminar Series	2/12/20
42. Keystone Symposium, Pain: Aligning the Target, Colorado	2/3/20
41. University of Pennsylvania, Dermatology Research Seminar Series	1/14/20
40. University of Pennsylvania, Psychology Colloquium Series	12/2/19
39. University of Texas at Dallas, School of Behavioral and Brain Sciences	11/7/19
38. Lasalle University, Department of Biology	10/1/19
37. University of Illinois at Chicago, Integrative Neuroscience Seminar Series	9/26/19
36. Fox Chase Cancer Center, Molecular Therapeutics Department	6/20/19
35. University of Maryland Baltimore County, Dpts. of Biology; Chemistry & Biochemistry	5/8/19
34. University of Washington, Seattle, Neuroscience Seminar Series	3/14/19
33. North Carolina A&T University, Department of Biology	1/23/19
32. University of California Santa Cruz, Dpt. Molecular, Cell, Developmental Biology	1/14/19
31. St. Joseph's University, Department of Biology	11/14/18
30. University of Pennsylvania, Center for Neurobiology and Behavior Seminar	10/26/18
29. Mid-Atlantic Pharmacology Society Meeting, Philadelphia, PA	9/27/18
28. University of Pennsylvania, mindCORE Seminar Series	9/4/18
27. Gordon Conference, Molecular and Cellular Neurobiology, Hong Kong	7/3/18
26. National Institutes of Health, Pain Consortium Symposium	5/31/18
25. Rockefeller University, Sense to Synapse Conference	5/12/18
24. Vanderbilt University School of Medicine, <u>Emerging Scholars Lecture</u>	5/3/18
23. Meharry Medical College, Department of Biochemistry and Cancer Biology	5/2/18
22. Bryn Mawr College, Chemistry Colloquia Series	4/16/18
21. Duke University, Department of Pharmacology	2/20/18
20. New York University, Department of Oral Surgery	2/7/18
19. University of Pennsylvania, Department of Biology	1/11/18
18. University of Pennsylvania, Department of Oral Surgery & Pharmacology	12/14/17
17. Johns Hopkins University, Department of Pharmacology & Molecular Sciences	12/12/17
16. Temple University, Center for Substance Abuse Research	12/7/17
15. Society for Neuroscience Meeting, Washington D.C.	11/11/17
14. Haverford College, Department of Biology	4/3/17

13. Syracuse University, Department of Biology	3/10/17
12. Rutgers University Camden, Department of Biology	1/19/17
11. Swarthmore College, Department of Biology	11/30/16
10. Mount Holyoke College, Department of Biological Sciences	11/8/16
9. University of Pennsylvania Dental School, Levy Series	10/27/16
8. Bucknell University, Department of Biology	10/3/16
7. Rutgers University Camden, Department of Biology	3/10/16
6. Virginia Tech University, Department of Biochemistry	1/13/16
5. 2nd International Symposium on Olfaction, Paris	9/19/13
4. University of Pennsylvania, Genetics Symposium	11/28/12
3. University of Pennsylvania, Cell and Molecular Biology Annual Symposium	10/11/11
2. International C.elegans Meeting, Los Angeles, CA	6/26/11
1. Society for Developmental Biology Meeting, Philadelphia, PA	6/3/11

**Classes Taught at the University of Pennsylvania** (percentage denotes portion of the course)

BIOL 221: Molecular Biology and Genetics. 50%, 120 students. Spring 2021  
 BIOL 221: Molecular Biology and Genetics. 50%, 150 students. Spring 2020  
 NGG 588: Topics in Translational Neuroscience, Spring 2020. (one course lecture)  
 BIOL 221: Molecular Biology and Genetics. 50%, 130 students. Spring 2019  
 Penn Summer Academies: Neuroscience Research Academy, 2019. (one course lecture)  
 Penn Summer Academies: Biomedical Research Academy, 2019. (one course lecture)

**Research Advising in Abdus-Saboar lab:** (\*denotes underrepresented minority)

Postdoctoral Fellows

2021–present Anissa Jhumka  
 2018–2021 Heather Rossi (currently Research Associate in Debroski Herbert lab at Penn)

Doctoral Students

2020–present Ryan Schwark, Neuroscience  
 2020–present Justin Burdge, Biology  
 2020–present Erin (Evonne) Jean\*, Immunology (co-mentored with Debroski Herbert at Penn)  
 2018–present Leah Middleton, Neuroscience  
 2018–present Melanie Schaffler\*, Neuroscience

Technicians

2020–present Isabella Succi  
 2018–2021 William Foster (incoming PhD student at Emory University)  
 2018–2020 Jessica Jones\* (currently PhD student at University of Washington)

Undergraduates

2019–2021 Justin Arnold\*, Biological Basis of Behavior  
 2019–2021 Lucie Pham, Biology  
 2019–2020 Samuel Kaufmann, Biology  
 2018–2019 Justin Burdge, Health and Societies (currently PhD student in Abdus-Saboar lab)

2019 Emma Lu, Biology  
 2018–2019 Migyana Thomas\*

Summer Interns

2020 Kayla Dennis\*  
 2020 Camille Harrison\*  
 2020 Meghan Wachira\*  
 2019 Isabella Succi (currently technician in Abdus-Saboor lab)  
 2019 Syphane Gibbs\* (currently PhD student at University of Virginia)  
 2019 Racquel Amadi\*  
 2019 Mariatu Fayia\*

Awards to Trainees

Leah Middleton NIH F31 NRSA Predoctoral Fellowship (NINDS) (2020–2023)  
 Erin (Evonne) Jean\* NSF Graduate Research Fellowship Program (2021–2024)  
 Justin Burdge NIH T32 Genetics Predoctoral Training Grant at Penn (2020–2023)  
 Samuel Kaufman Benjamin Franklin Scholars Summer Grant (2019,2020); Pincus-Magaziner Family Undergraduate Research and Travel Fund Grant (2019)

**Professional Service**

- Session Chair: US Association for the Study of Pain Annual Meeting (2020), Keystone Symposium Pain Meeting (2020)
- Journal Reviewer: Cell Reports, eLife, Journal of Neuroscience, Neuroscience, Pain, eNeuro, Molecular Pain, Neuroscience Letters, PLoS One
- Study Section/Grant Reviewer: NIH (2020), Department of Defense (2020), BWF (2019)

**Service to the University of Pennsylvania**

Biology Department

2020–2021 Seminar Committee  
 2020 Ad hoc Faculty Recruitment Committee  
 2020 Recruitment Day Chair for Ph.D. admissions weekend  
 2018–2020 Co-Director, Mentoring Circle Program for underrepresented minority students

School of Arts and Sciences

2019–2020 Member, Dean’s Committee for “Mapping the Mind”  
 2020–2021 Member, Dean’s Council on Diversity

School of Medicine

2020–2021 Seminar Committee, Department of Neuroscience  
 2020–2021 Faculty Advisory Board, E.E. Just Biomedical Society for underrepresented minority PhD students in Biomedical Graduate Studies

Graduate Student Qualifying Exam and/or Thesis Advisory Committees

Brandon Bastien, Neuroscience Graduate Group. 2020 – present

Jessica Wojick, Biology Graduate Group, 2020  
Michelle Klima, Neuroscience Graduate Group. 2020 – present  
Melina Gyparaki, Biology Graduate Group. 2019 – present  
Bishwas Sharma, Biology Graduate Group. 2019 – present  
Luigim Cifuentes, Neuroscience Graduate Group. 2019  
Yongjun Li, Biology Graduate Group, 2019  
Linyang Ju, Biology Graduate Group, 2019

### Outreach as Faculty

2021 Speaker for mindCORE event, “*Beyond the CV: Stories from Faculty*”  
2020 Speaker, Harvard Medical School Black Postdoctoral Association  
2020 External Participant, Monell Chemical Senses Center, Diversity Journal Club  
2020 Research Seminar, Penn SUIP and DAPPG underrepresented minority interns  
2020 Podcast Interview, Penn Science Policy and Diplomacy Group  
2020 Podcast Interview, UCSF Carry the One Radio  
2020 Feature Interview for middle school book project “*Healthy NewsWorks*”  
2020 Panelist, Postdoc Association (BPP) event, “Pursuing an Academic Career”  
2019 Research Seminar, Penn SUIP underrepresented minority interns  
2019 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 and Learning “*Workshop on Inclusive Teaching*”  
2019 Research Seminar Speaker for SUIP underrepresented minority interns  
2019 Research Seminar, ABRCMS Biomedical Research Conference, California  
2018 Panelist, Lasalle University STEM underrepresented minority day  
2018 Invited Research Seminar, Penn Neuroscience Honors Society  
2018 Speaker, SMASH STEM program for high school minority students

### TV Special, Media Coverage, Feature Stories

- Rita Allen Foundation, 2020. “*Announcing the 2020 Rita Allen Foundation Award in Pain Scholars*”
- Cell Press, 2020. “*100 inspiring black scientists in America.*”
- Katherine Baillie, 2019. “*The Science of Sensations*” Penn Today.
- 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.**
- Marla Vacek Broadfoot, 2018. “*How early STEM program and mentors paved the way for a career in science.*” Burroughs Wellcome Fund Feature Article.
- Gregory Richter, 2018. “*PennPORT (al) into a Thriving Science Career.*” Penn Medicine News.

### Scientific Society Memberships

- US Association for the Study of Pain
- International Association for the Study of Pain
- Society for Neuroscience