Nikhil Panicker, PhD

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Research Associate
Neurology/Institute for Cell Engineering,
The Johns Hopkins University School of Medicine
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Education

PhD in Molecular, Cellular and Developmental Biology (MCDB), minor in Neuroscience — 2009-16
Iowa State University, Ames IA, USA

Master of Science, Zoology (specialization in Molecular Biology) — 2007-09
University of Pune, India

Bachelor of Science, Biotechnology — 2004-07
University of Pune, India

Research Experience

Research Associate (Junior Faculty), Johns Hopkins Medicine

- Innate-immune responses that contribute to neurodegeneration and neuropathology in Parkinson's Disease, Alzheimer's Disease and related dementias. — 2020-Current

Postdoctoral fellow, Johns Hopkins Medicine (Mentors: Ted and Valina Dawson)

- Novel cell autonomous and non-cell autonomous pathways contributing to neuroinflammation and neurodegeneration — 2016-2020

Graduate Research Assistant, Iowa State University (Mentor: Anumantha Kanthasamy)

- Identifying the role of the non-receptor tyrosine kinase Fyn in microglial neuroinflammatory signaling pathways in Parkinson's Disease — 2010-16

Prior Research Experience

- Rotation student, MCDB Program, Iowa State University — 2009-10
- Research Assistant, Neuroscience Research Laboratory, University of Pune — 2009-09
- Pneumococcal Vaccine Development - Trainee, Research and Development Department, Serum Institute of India — 2007
- Undergraduate Research Assistant, University of Pune — 2006-07

Extramural Funding (limited to postdoctoral funding and career transition award)

- **Pathway to Independence Award (K99/R00), Grant no: K99AG066862 (NIH/NIA)** — 2020-22
  Title: ASC oligomerization and transmission as an initiating event for protein aggregation in Synucleinopathy Dementias; The major goals of this project are to explore the mechanisms through which to microglial NLRP3 inflammasome activation contributes to progressive alpha-synuclein aggregation in Synucleinopathy Dementias. $270,000, **Role: PI**

- **Postdoctoral Research Fellowship from the Maryland Stem Cell Research Fund (MSCRF)** — 2017-19
  Title: Activation of the NLRP3 inflammasome in human dopamine neurons as a consequence of Parkin dysfunction; Awarded to use stem-cell derived dopamine neurons to investigate neuronal NLRP3 inflammasome activation in Parkinson's disease. $130,000, **Role: PI**

- **Postdoctoral Research Fellowship from the Parkinson's Disease Foundation (PDF):** 2017-19
  The fellowship was offered, but I had to turn it down because I had made the commitment to accept the MSCRF Award

Research Publications (first-author publications listed first, rest chronologically)

- **Panicker N**., Kam T.I., Wang H., Neifert S., Kumar M., Brahmachari S., Jhaldiyal A., Hinkle J., Akkentli F., Mao X., Xu E., Karuppagounder S.S., Hsu E., Kang S.U., Pletnikova O., Troncoso J., Dawson V.L., Dawson T.M., Neuronal NLRP3 is a parkin substrate that drives neurodegeneration in Parkinson's Disease, **in preparation, expected 2020/2021.**

- **Panicker N.,** Sarkar S., Harischandra D.S., Neal M., Kam TI., Jin H., Saminathan H., Langley M., Charli A., Samidurai M., Rokad D., Pletnikova O., Dawson VL., Dawson TM., Anantharam V., Kanthasamy A.G., and Kanthasamy A., Fyn kinase regulates misfolded α-synuclein uptake and NLRP3 inflammasome activation in microglia, 2, **Journal of Experimental Medicine, 2019** Jun 3;216(6):1411-1430 **(Highlighted in Aging (NY), 10.18632/aging.102210).**

- **Panicker N**., Saminathan H., Jin H., Neal M., Harischandra D.S., Gordon R., Kanthasamy K., Lawana V., Sarkar S., Luo J., Anantharam V., Kanthasamy A.G., Kanthasamy A., Fyn kinase regulates microglial neuroinflammatory responses in cell culture and animal models of Parkinson's disease, **Journal of Neuroscience, 2015** Jul 8;35(27):10058-77.

- **Panicker N.,** Kanthasamy A.G., and Kanthasamy A., Fyn Amplifies NLRP3 Inflammasome Signaling in Parkinson's Disease. **Aging** (Albany NY). **2019** Aug 27;11(16):5871-5873

- **Panicker N.,** Dawson V.L., Dawson T.M., Activation mechanisms of the E3 ubiquitin ligase parkin., Journal of Cell Biology, **Biochemical Journal**. **2017** Aug 30;474(18):3075-3086 **(Editorial pick: https://twitter.com/PPPublishing/status/906049631787864065.**

- Sarkar S., Nguyen H.M., Malovic E., Luo J., Langley M., Palanisamy B., Singh N., Manne S., Neal M., Gabrielle M., Abdalla A., Anantharam P., Rokad D., **Panicker N**., Singh V., Ay M., Charli A., Harischandra D., Jin L.W., Jin H., Rangaraju S., Anantharam V., Wulff W., Kanthasamy A.G., Kv1.3 modulates neuroinflammation and neurodegeneration in Parkinson's disease, **Journal of Clinical Investigation, 2020** Jun 29:136174

- Kim S., Kwon S.H., Yun S.P., Kam T.I., **Panicker N**., Karuppagounder S.S., Lee S., Lee J.H., Kim W.R., Kook M., Foss C., Shen C., Kulkarni S., Pasricha P.J., Lee G., Pomper M., Dawson V.L., Dawson T.M., and Ko H.S., Transneuronal Propagation of Pathologic α-Synuclein from the Gut to the Brain Models Parkinson's disease. **Neuron. 2019** Aug 21;103(4):627-641.

- Kam T.I., Mao X., Park H., Chou S.C., Karuppagounder S.S., Umanah G.E., Yun S.P., Brahmachari S., **Panicker N**., Chen R., Andrabi S.A., Qi C., Poirier G.G., Pletnikova O., Troncoso J.C., Bekris L.M., Leverenz J.B., Pantelyat A., Ko H.S., Rosenthal L.S., Dawson T.M., and Dawson V.L., Poly (ADP-ribose) Drives Pathologic α-Synuclein Neurodegeneration in Parkinson's Disease, **Science. 2018** Nov 2;362(6414).

- Yun S.P*., Kam T.I*., **Panicker N**., Kim S., Oh Y., Park J.S., Kwon S.H., Park Y.J., Karuppagounder S.S., Park H., Kim S., Oh N., Kim N.A., Lee S., Brahmachari S., Mao X., Lee J.H., Kumar M., An D., Kang S.U., Lee Y., Lee K.C., Na D.H., Kim D., Lee S.H., Liddelow S.A., Mari Z., Barres B.A., L. Dawson V.L., Lee S., Dawson T.M., and Ko H.S., Block of A1 astrocyte conversion is neuroprotective in models of Parkinson's disease, **Nature Medicine. 2018** Jul;24(7):931-938.*- Shared authorship.

- Sarkar S., Malovic E., Hartischandra D., Ghaisas S., **Panicker N**., Charli A., Palanisamy B., Rokad D., Jin H, Anantharam V., Kanthasamy A., Kanthasamy A.G., Mitochondrial impairment in microglia amplifies NLRP3 inflammasome proinflammatory signaling in cell culture and animal models of Parkinson's disease, **npj Parkinson's Disease**. **2017** Oct 17;3:30.

- Liddelow S.A., Clarke L.E., Bennett M.L., Bennett F.C., Münch A.E., Guttenplan K.A., Schirmer L., Chung W-S., Peterson T.C., Wilton D.K., Frouin A., Napier B.A., **Panicker N**., Kumar M., Dawson V.L., Dawson T.M., Buckwalter M.S., Rowitch D.H., Stevens B., Barres B.A., Neurotoxic reactive astrocytes are induced by activated microglia, **Nature**. **2017** Jan 26;541(7638):481-487.

- Mao X., Ou M., Karuppagounder S.S., Kam T-I., Yin X., Xiong Y., Ge P., Umanah G.E., Brahmachari S., Shin J-H., Kang H.C., Zhang J., Xu J., Chen R, Park H., Andrabi S.A., , Kang S.U. Gonçalves R.A., Liang Y., Zhang S., Qi C., Lam S., Keiler J.A., Tyson J., Kim D., **Panicker N**., Yun S.P., Workman C.J., Vignali D.A.A., Dawson V.L.,Ko H.S., Dawson T.M., Pathological α-synuclein transmission initiated by binding, **Science**, **2016** Sep 30;353(6307). pii: aah3374.

- Gordon R., Neal M., Luo J., Langley M., Harischandra D.S., **Panicker N**., Charli A., Jin H, Anantharam V., Woodruff T.M., Zhou Q-Y., Kanthasamy A.G. and Kanthasamy A., Prokineticin-2 upregulation during neuronal injury mediates a compensatory protective response against dopaminergic neuronal degeneration, **Nature Communications**, **2016** Oct 5;7:12932. doi: 10.1038/ncomms12932.

- Gordon R., Singh N., Lawana V., Ghosh A., Harischandra D., Jin H., Hogan C., Sarkar S, Rokad D., **Panicker N**., Anantharam V., Kanthasamy AG., Kanthasamy A., PKCδ Upregulation in Microglia Drives Neuroinflammatory Responses and Dopaminergic Neurodegeneration in Experimental Models of Parkinson's Disease., **Neurobiology of Disease**, **2016** May 2. pii: S0969-9961.

- Jin H., Kanthasamy A., Harischandra D.S., Kondru N., Ghosh A., **Panicker N**., Anantharam V., Rana A., Kanthasamy A., Histone Hyperacetylation Up-regulates Protein Kinase Cδ in Dopaminergic Neurons to Induce Cell Death: Relevance to epigenetic mechanisms of neurodegeneration in Parkinson disease, **Journal of Biological Chemistry**, **2014** Dec 12;289(50):34743-67.

Honors & Awards

▪ Research Excellence Award, Biomedical Sciences Department, Iowa State University	2016
▪ Veterinary Medicine Biomedical Research Graduate Scholarship, Iowa State University	2015
▪ The Brown Graduate Fellowship, awarded for outstanding research at Iowa State University in areas of biomedical, agriculture and space science	2014
▪ ASPET Best Abstract Award (Runner up), Molecular Pharmacology Division, Experimental Biology Conference, San Diego	2014
▪ ASPET Graduate Student Travel Award, Experimental Biology Conference, San Diego	2014
▪ Biotex Laboratories Junior Scientist Award in Immunology, Experimental Biology Conference, San Diego	2014
▪ Professional Development Grant (PAG) Award, Iowa State University	2014
▪ Graduate Poster Presentation Award - 2nd place - Iowa State University	2013
▪ The David Gladson Scholarship for graduate research on neurological disorders, Iowa State University	2013
▪ Interdepartmental Poster Competition – Best Graduate Poster (Runner up), Iowa State University	2013
▪ Graduate Student Poster Presentation Award - 1st place, Central States of Toxicology	2012
▪ Junior Research Fellowship, Council of Scientific & Industrial Research (CSIR), India	2009

Posters & Presentations (limited to first and presenting author presentations)

- **Panicker N,** et al., NLRP3 is a neuronal Parkin substrate that drives neurodegeneration in Parkinson's Disease, **Cold Spring Harbor Neurodegenerative Disease: Biology & Therapeutics Meeting** 2020
- **Panicker N,** et al., NLRP3 inflammasome activation in dopamine neurons contributes to neurodegeneration in Parkinson's Disease, **Experimental Biology Conference- Abstract accepted, conference canceled due to COVID-19** 2020
- **Panicker N,** et al., Activation of the NLRP3 Inflammasome in Human Dopamine Neurons as a Consequence of Parkin Dysfunction, **MSCRF Stem Cell Symposium.** 2017
- **Panicker N,** et al., Aggregated human alpha-synuclein activates the NLRP3 inflammasome in microglia through a Fyn-dependent signaling pathway, **Neuroinflammation in Diseases of the Central Nervous System Keystone Conference.** 2015
- **Panicker N,** et al., Fyn kinase regulates microglial neuroinflammatory responses in cell culture and animal models of Parkinson's disease, **Experimental Biology Conference.** 2014
- **Panicker N,** et al., Alpha-synuclein protein aggregates activate microglia through a Fyn Kinase-dependent mechanism, **Society of Toxicology Conference.** 2013
- **Panicker N,** et al., Anti-inflammatory effects of Fyn kinase inhibitors rosmarinic, caffeic acids in Mn nanoparticle induced neuroinflammation, **Society of Toxicology Conference.** 2012

Peer reviewing experience

- Independently: **Science Advances**, **Toxicological Sciences**, **Clinical Science**, **Bioscience Reports, Journal of Parkinson's Disease**
- In conjunction with postdoctoral mentors: **Cell**, **Nature**, **Neuron**, **Science Translational Medicine**, **Nature Medicine, Nature Neuroscience**, **PNAS**, **eLife**, **Neurobiology of Disease**.
- Associate Faculty Member, **Faculty Prime** (Formerly F1000) - I work with Primary Faculty Ted Dawson to review and recommend articles in the Neurobiology of Disease & Regeneration section.

Mentoring experience

Name	Position when mentored	Current Position	Year
Lauren Christensen*	Freshman at JHU	Undergrad, U of Utah	2017-18
Jared Hinkle#	MD/PhD student, JHU	MD/PhD student, JHU	2018-current
Nithin Lankipalle*,#	Undergrad at JHU	Senior, JHU	2019-current
Evan Lau#	Undergrad at JHU	Senior, JHU	2019-current
Leslie Watkins#	Summer Intern at JHU	Fall Intern, JHU	2020-current
Zach Baker*	FARMS Fellow from GMU	PhD student at JHU	2018
Eric Hsu#	Rotation Student at JHU	PhD student at JHU	2019
Souvarish Sarkar#	Rotation student, grad student at Iowa State	Postdoc at Harvard	2013-16

*I wrote a recommendation letter for this mentee; #We have co-authored a publication (in prep or published);
JHU= Johns Hopkins University, GMU= George Mason University

Invited talks

- "Innate-immune responses to alpha-synuclein facilitate its progressive aggregation", **University of Pennsylvania/Children's Hospital of Philadelphia**, delivered via Zoom — 12/2020
- "Innate-immune responses to alpha-synuclein facilitate its progressive aggregation", **Johns Hopkins Dementia Consortium**, delivered via Zoom — 11/2020
- "Mechanisms and Consequences of Inflammasome Activation in Synucleinopathies", **Iowa State University**, **Department of Biomedical Sciences**, delivered via Zoom — 08/2020
- "Parkin limits priming and activation of the NLRP3 inflammasome in dopaminergic neurons", **3P Seminars**, delivered via Zoom — 04/2020
- "Inflammasome activation in Parkinson's Disease", **Indian Institute of Science Education and Research (IISER)**, Pune, India — 06/2019
- "Fyn kinase regulates microglial neuroinflammatory responses in Parkinson's Disease", **Experimental Biology Conference**, San Diego — 04/2014

Professional Membership

- Society for Neuroscience- Postdoc Member
- American Society for Pharmacology and Experimental Therapeutics (Postdoc Member)

List of References (additional references available upon request)

1. Ted M. Dawson, M.D., Ph.D.
Leonard and Madlyn Abramson Professor in Neurodegenerative Diseases
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Please request confidential letter of support from Dr. Dawson's administrative assistant, Eleni Georgantonis, Email: egeorga1@jhmi.edu

2. Marilyn Albert, Ph.D.
Director of Cognitive Neuroscience, Department of Neurology, Professor of Neurology
ADRC Director
Johns Hopkins University School of Medicine
E-mail: malbert9@jhmi.edu
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3. Anumantha Kanthasamy MS, MPhil, PhD
Lloyd Endowed Chair and Eminent Scholar in Veterinary Medicine Biomedical Sciences
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