

Research and Work Experience

Research Scientist 09/2013 – 08/2017
*University of Texas Southwestern Medical Center,
Department of Cell Biology*

- Study of mechanisms of protein trafficking to the cilia using biochemistry, high confidence proteomics and various cellular approaches to identify the molecular machines facilitating ciliary protein trafficking.

Postdoctoral Research Associate 12/2009 – 6/2013
*University of Arizona,
Department of Immunobiology*

- Studied the molecular mechanisms governing T cell fate decisions using live cell imaging, molecular and biochemical approaches. I studied the signal transduction occurring between the peptide MHC-T-cell receptor and associated CD3 proteins and the Co-receptor CD4.

Research Funding

University of Arizona Center for Insect Science Seed Grant for 2010
Interdisciplinary Research (\$ 12000)

Conference Attendance by Vanderbilt undergraduate mentees

(Students mentored by Badgandi are underlined)

- Emily Heathcote and Hemant B Badgandi.
2020 Annual Biomedical Research Conference for Minority Students. November 2020,
“Uncovering MAGE-B2 function using proteomics and interactome analysis”
- Alexander Gousie, Emily Heathcote and Hemant B. Badgandi.
2020 Annual meeting of the American Society of Cell Biology, December 2020,
“Uncovering MAGE-B2 function using proteomics and interactome analysis”

Publications

(Students mentored by Badgandi are underlined
and student contributions are *italicized*)

- **Hemant B. Badgandi**, Andrezej Weichsel, William R. Montfort.
Nitric oxide delivery and heme-assisted S-nitrosation by the bedbug nitrophorin. *J. Inorg. Biochem.*, 2023, 246: article 112263.
- Bandarigoda Somatilaka, Sun-Hee Hwang, Vivek Reddy Palicharla, **Hemant Badgandi**, John Shelton and Saikat Mukhopadhyay.
Ankmy2 prevents Smoothed-independent hyperactivation of the hedgehog pathway via Cilia-Regulated Adenylyl cyclase signaling. *Developmental Cell*, 2020 54(6): 710-726.
- Sun-Hee Hwang, Bandarigoda Somatilaka, **Hemant B. Badgandi**, Rebecca Walker, John Shelton, Feng Qian, Saikat Mukhopadhyay.

- Tulp3 regulates kidney cytotogenesis by trafficking of cystoproteins to cilia. *Current Biology*. 2019 29(5): 790-802
- **Hemant B Badgandi***, Sun-Hee Hwang, Issei S. Shimada, Evan Lorient, Saikat Mukhopadhyay*. (***Co-Corresponding authors**).
Tulp3 and Tubby function as general adapters for trafficking of structurally diverse integral membrane proteins to the primary cilium.
J. Cell. Biol. 2017, 216(3):743-760
Evan Lorient contributed plasmids and cell lines, data generated using these cell lines are part of Figure 1A in the above paper. I trained Evan in molecular biology, cloning, generating stable cell lines and immunofluorescence microscopy.
 - Issei S. Shimada, **Hemant B. Badgandi**, Bandarigoda Somatilaka and Saikat Mukhopadhyay.
Using primary neurosphere cultures to study primary cilia. In Press. *J Visual Experimentation*. (122), e55315, doi:10.3791/55315 (2017)
Bandarigoda Somatilaka performed image analysis using ImageJ software, data from analysis are part of Figure 5. I trained Somatilaka in performing multi-channel immunofluorescence image analysis using ImageJ/Micromanager.
 - Saikat Mukhopadhyay, **Hemant B Badgandi**, Sun-Hee Hwang, Bandarigoda Somatilaka, Issei S. Shimada, Kasturi Pal.
Trafficking to the primary cilium membrane. *Mol. Biol. of Cell*
DOI:10.1091/mbc.E16-07-0505, 2017, 28
Bandarigoda Somatilaka contributed to this Review Article, I advised Somatilaka in performing a literature survey and assembling information used in her contributions for the manuscript.
 - Kasturi Pal, Sun-Hee Hwang, Bandarigoda Somatilaka, **Hemant Badgandi**, Peter Jackson, Katherine DeFea, Saikat Mukhopadhyay.
Smoothed determines β -arrestin-mediated removal of the G protein-coupled receptor Gpr161 from the primary cilium. *J. Cell. Biol.* 2016; 212(7):861-75.
 - Mark Lee, Caleb Glassman, Neha Deshpande, **Hemant B Badgandi**, Heather Parrish, Chayasinth Uttamapinant, P Stawski, Alice Ting, Micheal Kuhns.
A Mechanical Switch Couples T Cell Receptor Triggering to the Cytoplasmic Juxtamembrane Regions of CD3 ζ . *Immunity*. 2015; 43(2):227-39.
Heather Parrish generated stable cell lines and performed functional analyses of the cell lines using ELISA plate assays and Flow Cytometry. I trained Heather in all the methods used.
 - Lewis Hun, Anam Arik, Kendra M. Quicke, Micheal Platt, Rolf Zeigler, Patricia Scaraffia, **Hemant. B. Badgandi**, Michael A. Reihle.
Increased Akt signaling in the mosquito fat body increases adult survivorship. *FASEB Journal* 2015, 29: 1404-1413
 - Kasturi Pal*, **Hemant B Badgandi***, Saikat Mukhopadhyay. (***Co-First Authors**)
Studying G protein-coupled receptors: immunoblotting, immunoprecipitation, phosphorylation, surface labeling, and cross-linking protocols.
Methods Cell Biol. 2015; 127:303-22.
 - Michael S. Kuhns and **Hemant B. Badgandi**.
Piecing together the family portrait of TCR-CD3 complexes. *Immunological Reviews*. 2012; 250: 120-143

- Jun Isoe, Jennifer Collins, **Hemant Badgandi**, W. Anthony Day, Roger L. Miesfeld.
Defects in COP1 transport system cause rapid death in blood-fed Dengue mosquitoes. *Proc. Natl. Acad. Sci USA*. 2011; 108: E211-217

Selected Conference Presentations

- **Hemant B Badgandi**
2017 FASEB Meeting on Polycystic Kidney Disease, Big Sky, Montana, June 2017
“Tubby family proteins, ciliary trafficking and polycystic kidney disease”
Invited Talk and FASEB Travel Award Recipient
- **Hemant B. Badgandi**, Sun-Hee Hwang, Issei S. Shimada and Saikat Mukhopadhyay.
2016 Annual meeting of the American Society of Cell Biology, San Francisco CA
December 2016. “Tulp3 and Tubby function as general adapters for trafficking of structurally diverse integral membrane proteins to the primary cilium.”
Invited Talk
- **Hemant B. Badgandi** and Saikat Mukhopadhyay
Keystone Symposia: G Protein-Coupled Receptors: Structure, signaling and Drug Discovery, Keystone, Colorado, February 2016. “A unifying model for GPCR trafficking to the primary cilium.”
- **Hemant B. Badgandi** and Saikat Mukhopadhyay
2015 Annual Meeting of the American Society of Cell Biology, San Diego, CA,
December 2015. “A unifying model for GPCR trafficking to the primary cilium.”
- Saikat Mukhopadhyay, Sun-Hee Hwang, Kasturi Pal and **Hemant B. Badgandi**.
Keystone Symposia: G Protein-Coupled Receptors: Structural Dynamics and Functional Implications, Snowbird, Utah, March 2014. “GPCRs, Hedgehog Signaling and Primary Cilia.”
- **Hemant Badgandi**, Mark S. Lee, Neha Deshpande, Jelana Vasic, Veronica So, and Michael S. Kuhns.
2011 Frontiers in Biomedical Research. Tucson, Arizona, October 2011. Poster: “Analysis of the Molecular Mechanisms governing T cell fate decisions.”
- **Hemant Badgandi** and Micheal A. Reihle.
59th Annual Meeting of the American Society for Tropical Medicine and Hygeine, Atlanta, Georgia. November 2010. Poster: “Insulin Signaling in the mosquito: Understanding Akt physiology in the fat body and PTEN regulation at the molecular level.”
- **Hemant Badgandi**, Andrzej Weichsel, James T. Hazzard, Gordon Tollin, William R. Montfort.
22nd Symposium of The Protein Society, San Diego, California, July 2008. Poster: “Heme-Assisted S-Nitrosation at the Cys-60 in Cimex Nitrophorin.”
- **Hemant Badgandi**, Jun Isoe, Roger Miesfeld, William Montfort.
21st Symposium of The Protein Society, Boston, Massachusetts, July 2007.
“Ecdysone Inducible Protein 75, a heme-based transcription regulator.”

Invited Seminars/Presentations As First Author

- Symbiosis International University, School of Biological Sciences, Pune, India. July 2019.
“Role of Primary Cilia in signaling, development and disease”
- Augsburg University, Department of Biology, Minneapolis MN. February 2019
“Using Primary Cilia as a major signaling center in designing Undergraduate research experiences.”
- California State University, Department of Chemistry and Biochemistry, Long Beach, Long Beach CA. February 2018
“Using Primary Cilia as a major signaling center in designing Undergraduate research experiences.”
- Central Connecticut State University, Department of Chemistry, New Britain, CT. January 2018
“Protein are the machines of life”
- 2017 FASEB Meeting on Polycystic Kidney Disease, Big Sky, Montana, June 2017
“Tubby family proteins, ciliary trafficking and polycystic kidney disease”
- University of Tennessee at Martin, Department of Biological Sciences, Martin, TN. 6th April 2017
“Proteins are the machines driving biology”
- 2016 Annual meeting of the American Society of Cell Biology, San Francisco CA. 5th December 2016.
“Tulp3 and Tubby function as general adapters for trafficking of structurally diverse integral membrane proteins to the primary cilium.”
- UT Southwestern Medical Center, Department of Cell Biology, Dallas, TX. 5th August 2013
“The T-cell Receptor: A dynamic complex molecular machine”
- UT Southwestern Medical Center, Department of Biophysics, Dallas, TX. 11th April 2013
“Analysis of Molecular mechanisms governing T-cell Fate decisions”
- University of Arizona College of Medicine, Department of Immunobiology, Tucson, AZ. 15th November 2010
“Lifespan extension and control of reproductive fecundity in *Aedes aegypti* by manipulation of insulin signaling”
- Michigan State University, Department of Biochemistry, East Lansing, MI 12 November 2008
“Biology Facilitated by Hemeproteins as seen in Cimex Nitrophorin and Ecdysone inducible protein 75”
- University of California-Davis, Department of Chemistry, Davis, CA 3 November 2008
“Biology Facilitated by Hemeproteins as seen in Cimex Nitrophorin and Ecdysone inducible protein 75”

Professional Activities and Service

- University of Arizona's Undergraduate Biology Research Program Annual Conference, Tucson, Arizona. Years judged 2006-2011.
- Dallas Independent School District Science Fair. Dallas, Texas. Years Judged 2013-2016.
- UT Southwestern STARS Program Research Fair. Judged 2014-2016
- US Army Educational Outreach Program's Ecybermission. Online Judge 2016-present
- ABRCMS 2015, Seattle WA. On-site Judging.
- ABRCMS 2016, Tampa FL. On-site Judging
- ABRCMS 2014-present, Online Abstract Reviewing
- Guest Reviewer, *GENE*, Elsevier Inc. USA
- Guest Reviewer, *Journal of Ophthalmic Research*, Karger AG, Basel, Switzerland
- Reviewer for *Biochemistry* by Roger Miesfeld and Megan McEvoy, 2nd edition 2019, W.W. Norton and Co., NY, USA
- Panelist, American Society for Biochemistry and Molecular Biology (ASBMB) Workshop on "Navigating career development and building resilience in times of unrest", November 18 2020
- ASBMB Accreditation Exam Committee 2020-present.