Sina Ghaemmaghami, PhD

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Education and Research

McMaster University, Hamilton, ON Canada (1991-1996)
BS, Biochemistry. Graduated with Honors.
Advisor: Dr. Vitai Ananthanarayanan

Duke University, Durham, NC (1996-2001)
Ph.D., Biochemistry
Advisor: Dr. Terrence Oas

Research focus: proteomics and protein folding
Thesis: "Analysis of Protein Stability by Hydrogen Exchange"

University of California, San Francisco (2001-2006)
Postdoctoral Fellow, Department of Cellular & Molecular Pharmacology
Advisor: Dr. Jonathan Weissman

Research focus: proteomics and functional genomics in yeast

University of California, San Francisco (2006-2012)
Adjunct Professor, Institute for Neurodegenerative Diseases
Advisor: Dr. Stanley Prusiner

Research focus: proteomics and prion biology

University of Rochester (2012-present)
Assistant Professor, Department of Biology

Research focus: protein degradation, proteomics, prion biology

Other U of R affiliations: Center for Neural Development and Disease, Biophysics, Structural Biology and Computational Biology Graduate Program, Biochemistry and Molecular Biology Graduate Program, Biological Chemistry Cluster, Director of the University of Rochester Mass Spectrometry Resource Lab

Honors and Awards

1991	Ontario Scholarship, Canada
1991-1995	Dean's Honor List, McMaster University, Hamilton, Canada
1995-1996	NSERC (Canada) Undergraduate Industrial Fellowship
1996-1999	NIH Predoctoral Trainee
2001-2002	Howard Hughes Postdoctoral Trainee
2002-2005	NIH Ruth L. Kirschstein Postdoctoral Fellowship
2003-2005	UCSF Postdoctoral Teaching Fellowship
2007-2009	The John Douglas French Alzheimer's Foundation Distinguished Research Scholar Award

2014-2019 NSF Faculty Early Career Development (CAREER) Award
2016 Thermo Scientific / American Society of Mass Spectrometry TMT Innovation Award

Professional Organizations and Outside Service

2010-present American Society for Mass Spectrometry
1996-present American Association for the Advancement of Science
1996-present The Protein Society
1996-present Reviewer for Biochemistry, Analytical Chemistry, Molecular and Cellular Proteomics, Cell Systems, Autophagy, PLOS One and Prion journals
2001-2002, 2005 Howard Hughes Medical Institute
2013-present Human Proteome Organization
2013-present Ad-hoc reviewer for the National Science Foundation

Scientific Presentations

2000 Protein Society Symposium, San Diego, CA, (selected speaker)
2001 International Symposium on Mass Spectrometry in the Health and Life Sciences, San Francisco, CA, (poster)
2002 Vanderbilt Genomic Conference, Nashville, TN (poster)
2002 Yeast Genetics and Molecular Biology Meeting, Madison, WI (selected speaker)
2002 American Association of Pharmaceutical Scientists (AAPS) Annual Conference, Toronto, Canada, (invited speaker)
2004 Beyond Genome: Proteomics, San Francisco, CA, (invited speaker)
2004 Duke Symposium on Computational Protein Biology, Durham, NC (invited speaker)
2004 Genentech Research in Progress Series, San Francisco, CA (invited speaker)
2006 Prion Conference, Torino, Italy (poster)
2006-2010 Annual Fairchild Foundation Symposium, San Francisco, CA (invited speaker)
2008 Prion Conference, Madrid, Spain (poster)
2010 Prion Conference, Salzburg, Austria (selected speaker)
2010 Mainz University, Germany, Department of Chemistry (invited speaker)
2011 Prion Conference, Montreal, Canada (selected speaker)
2012 Keystone Symposium, Proteomics and Interactomes, Stockholm, Sweden (selected speaker)
2012 University of Rochester Biophysics Retreat (invited speaker)
2012 University of Rochester Department of Microbiology and Immunology (invited seminar speaker)
2013 Prion Conference, Banff, Canada (selected speaker)
2013 University of Rochester Aging Day (invited speaker)
2013 University of Rochester Department of Biochemistry Retreat (invited speaker)
2013 University of Rochester Chemistry-Biology Cluster Retreat (invited speaker)
2013 The Buck Institute for Research on Aging (invited seminar speaker)
2013 University of Rochester Summer Scholars Program Seminar (invited speaker)
2013 University of Toronto, Tanz Center for Research in Neurodegenerative Disease (invited speaker)
2014 Wilkes University, Department of Chemistry (invited speaker)
2014 University of Rochester Center for Neural Development and Disease Seminar
2014 Human Proteome Organization (invited speaker)
2014 SUNY Geneseo, Department of Chemistry (invited speaker)
2014 Niagara University, Department of Chemistry (invited speaker)

2014	Allegheny College, Department of Biology (invited speaker)
2015	Keystone Symposium, Autophagy, Breckenridge Colorado (poster presentation)
2015	University of Rochester, Department of Biology Donut Talks
2015	University of Rochester Biophysics Retreat (invited speaker)
2015	University of Massachusetts Department of Biochemistry and Molecular Biology (invited speaker)
2016	University of Toronto, Department of Biochemistry (invited speaker)
2016	Broad Institute of Harvard and MIT, Chemical Biology (invited speaker)
2016	University of Rochester Medical Center, The Informatics and Genomics Research Center (TIGR) (invited speaker)
2017	Duke University, Department of Chemistry (invited speaker)
2017	University of California San Francisco, Institute for Neurodegenerative Diseases (invited speaker)

Teaching and mentorship

2012	BIO581: Topics in Cellular, Developmental and Molecular Biology (one lecture)
2012	BIO395: Independent Study (supervised one student)
2012-2016	Advisor to two Ph.D. students and one MS student
2012-2016	Mentored 18 undergraduates and 2 high school students in various research projects. Two undergraduates were co-authors on published review papers.
2013	BIO395: Independent Study (supervised three students)
2013	BIO581: Topics in Cellular, Developmental and Molecular Biology (one lecture)
2014	BIO395: Independent Study (supervised one student)
2014	BIO516: Cell/Dev/Mol Biology Seminar
2014-2016	BIO581: Topics in Cellular, Developmental and Molecular Biology (one lecture each year)
2014-2016	IND408: Advanced Biochemistry (two lectures each year)
2014-2016	BIO250H/252: Introduction to Biochemistry-Honors (developed the course)
2015	BIO395: Independent Study (supervised eight students)
2015	BIO395: Independent Study (supervised seven students)
2016	IND419: Introduction to Quantitative Biology (three lectures)

University Service

2012	Departmental Committees: seminar series, faculty search
2013	Departmental Committees: seminar series, departmental retreat
2013-2014	Initiated a program for seminars given by student-invited speakers in the Department of Biology
2013-2014	Proteomics core facility advisory committee
2013-2014	Participated in minority recruitment efforts of the Biochemistry and Molecular Biology programs by at a number of local colleges
2013-2016	Part of thesis and qualification committees of six Ph.D. students
2013-2016	Biophysics, Structural Biology and Computational Biology Graduate Program selection committee
2014	Internal grant review panels for the Center for AIDS research (CFAR)
2014	Participated in minority graduate student recruitment efforts of the Biochemistry department by giving presentations at a number of local colleges

2014	Participated in Big Data Initiative faculty search as a Biology Department representative
2014	Departmental Committees: seminar series, retreat, faculty search
2014	Center for Excellence in Teaching and Learning (CETL) hiring committee and Student Course Development Projects (SCDP) program participant
2014-2016	Participated in the organization of the Upward Bound program
2015	Participated in McNair Scholarship program
2015	Departmental Committees: seminar series, retreat
2015-present	Director of the University of Rochester Mass Spectrometry Resource Lab

Research Support

Current support

National Science Foundation
MCB-1350165 CAREER (PI: Ghaemmaghami) 1/01/2014 – 12/31/2018
000497-NSF $123,778 Annual Direct

"Career: Global analysis of in vivo protein folding efficiencies by mass spectrometry"
National Institutes of Health
1S100D021486-01 (PI: Ghaemmaghami) 03/15/2016 – 03/14/2017
NIH S10 Shared Instrumentation Award $308,767
"QExactive+ for University of Rochester Proteomics Research"

National Institutes of Health
1 R35 GM119502-01 (PI: Ghaemmaghami) 08/01/2016 – 05/31/2021
000205 - DHHS/PHS/NIH $236,256 Annual Direct
"The prevalence and mechanism of selectivity in basal autophagy

Completed

Collaborative Bioinformatics Pilot Award from Center for Integrative Bioinformatics and Experimental Mathematics (CIBEM)
Quantitative proteomic analysis of influenza-infected mice
[PI: Ghaemmaghami]
(5/1/2013 - 4/30/2015 - $49,282)

Patents:

Quantitative, high-throughput screening method for protein stability (US 7148071 B2)

Methods for detecting modification resistant nucleic acids (US 20100120625 A1)

Isotopic labeling for the measurement of global protein levels and turnover *in vivo* (EP 2582789 A4)

Publications:

1. S. Ghaemmaghami, J.M. Word, R.E. Burton, J.S. Richardson and T.G. Oas (2000). Folding kinetics of a fluorescent variant of monomeric λ repressor. ***Biochemistry*** 37, 9179-918

2. S. Ghaemmaghami, M.C. Fitzgerald and T.G. Oas (2000). A quantitative, high-throughput screen for protein stability. ***Proc. Natl. Acad. Sci. USA*** 97, 8296-8301

3. S. Ghaemmaghami and T.G. Oas (2001). Quantitative protein stability measurement in vivo. ***Nature Struct. Biol.*** 8, 879-882

4. K.D. Powell, S. Ghaemmaghami*, M.Z. Wang, M. Liyuan, T.G. Oas and M.C. Fitzgerald (2002). A general mass spectrometry-based assay for the quantitation of protein-ligand binding interactions in solution. ***J. Am. Chem. Soc.*** 124, 10256-10257

5. S. Ghaemmaghami, W.K. Huh, K. Bower, R.W. Howson, A. Belle, N. Dephoure, E.K. O'Shea and J.S. Weissman (2003). Global analysis of protein expression in yeast. ***Nature*** 425, 737-741

6. R. Howson, W.K. Huh, S. Ghaemmaghami, J.V. Falvo, K. Bower, A. Belle, N. Dephoure, D.D. Wykoff, J.S. Weissman and E.K. O'Shea (2005). Construction, verification, and experimental use of two epitope-tagged collections of budding yeast strains. ***Comp. Funct. Genomics*** 6, 2-16

7. J.R.S. Newman, S. Ghaemmaghami, J. Ihmels, D.K. Breslow, M. Noble, J.L. DeRisi and J.S. Weissman (2006) Single-cell proteomic analysis of *S. cerevisiae* reveals the architecture of biological noise. ***Nature*** 441, 840-846 918

8. S. Ghaemmaghami, P.W. Phuan, B. Perkins, J. Ullman, B.C. May, F.E. Cohen, S.B. Prusiner (2007) Cell division modulates prion accumulation in cultured cells. ***Proc. Natl. Acad. Sci. USA*** 104, 17971-17976

9. N.T. Ingolia, S. Ghaemmaghami, J.R.S. Newman, and J.S. Weissman (2009) Genome-wide analysis in vivo of translation with nucleotide resolution using ribosome profiling. ***Science*** Apr 10 v324, 218-223

10. Ghaemmaghami S, Ahn M, Lessard P, Giles K, Legname G, DeArmond SJ, Prusiner SB. (2009) Continuous quinacrine treatment results in the formation of drug-resistant prions. ***PLoS Pathog.*** Nov;5(11):e1000673. Epub 2009 Nov 26

11. Ghaemmaghami S, Ullman J, Ahn M, St Martin S, Prusiner SB. (2009) Chemical induction of misfolded prion protein conformers in cell culture. ***J Biol. Chem.*** Apr 2;285(14):10415-23

12. Ghaemmaghami S, May BC, Renslo AR, Prusiner SB (2010) Discovery of 2-aminothiazoles as potent antiprion compounds. ***J. Virol.*** Apr; 84(7):3408-12

13. Price JC, Guan S, Burlingame A, Prusiner SB, Ghaemmaghami S (2011) Analysis of proteome dynamics in the mouse brain. ***Proc. Natl. Acad. Sci. USA*** Aug 10;107(32):14508-13

14. Poncet-Montange G, St Martin SJ, Bogatova OV, Prusiner SB, Shoichet BK, Ghaemmaghami S* (2011) A survey of antiprion compounds reveals the prevalence of non-PrP molecular targets. ***J. Biol. Chem.*** Aug 5;286(31):27718-28 (refereed research article)

15. Ghaemmaghami S, Watts J, Nguyen H, Hayashi S, Lemus A, DeArmond SJ and Prusiner SB (2011) Conformational transformation and selection of synthetic prion strains. ***J. Mol. Biol.*** Oct 28;413(3):527-42

16. Guan S, Ghaemmaghami S, Price JC, Prusiner SB, Burlingame AL (2011) A data processing pipeline for mammalian proteome dynamics studies using stable isotope metabolic labeling. ***Mol. Cel. Proteomics*** Dec;10(12):M111.010728

17. Friberg KN, Hung G, Wancewicz E, Giles K, Black C, Freier S, Bennett F, DeArmond SJ, Freyman Y, Lessard P, Ghaemmaghami S, Prusiner SB (2012) Intracerebral Infusion of Antisense Oligonucleotides Into Prion-infected Mice. ***Mol. Ther. Nucleic Acids*** 1, e9; doi:10.1038/mtna.2011.6

18. Guan S, Price JC, Ghaemmaghami S, Prusiner SB, Burlingame AL (2012) Compartment modeling for mammalian protein turnover studies by stable isotope metabolic labeling. ***Anal. Chem.*** Mar 23. May 1;84(9):4014-21

19. Ahn M, Ghaemmaghami S, Huang Y, Phuan PW, May BC, Giles K, Dearmond SJ, Prusiner SB. (2012) Pharmacokinetics of Quinacrine Efflux from Mouse Brain via the P-glycoprotein Efflux Transporter. ***PLoS One.*** 7(7):e39112

20. Ghaemmaghami S, Colby DW, Nguyen HO, Hayashi S, Oehler A, DeArmond SJ, Prusiner SB. (2013) Convergent replication of mouse synthetic prion strains. ***Am J Pathol.*** 182(3):866-74

21. Silber BM, Gever JL, Li Z, Gallardo-Godoy A, Renslo AR, Widjaja K, Irwin JJ, Rao S, Jacobson MP, Ghaemmaghami S, Prusiner SB. (2013) Antiprion compounds that reduce PrPSc levels in dividing and stationary-phase cells. ***Bioorgan. Med. Chem.*** 15;21(24):7999-8012

22. Miller-Vedam L, Ghaemmaghami S. (2013) Strain Specificity and Drug Resistance in Anti-Prion Therapy. ***Cur. Top. Med. Chem.*** 13(19):2397-406

23. Price JC, Ghaemmaghami S. (2014) Analysis of proteome dynamics in mice by isotopic labeling. ***Methods. Mol. Biol.*** 1156:111-31

24. Ghaemmaghami S, Russo M, Renslo AR. (2014) Successes and Challenges in Phenotype-Based Lead Discovery for Prion Diseases. ***J. Med. Chem.*** Aug 28;57(16):6919-29

25. Zhang T, Nouri E, Li J, Price JC, Hellerstein M, Qu J, Ghaemmaghami S. (2014) Kinetics of precursor labeling in SILAC experiments. ***Anal. Chem***. Nov 18;86(22):11334-41

26. Shen S, Li J, Zand M, Wu H, Ghaemmaghami S, Qu J (2016) An Ion-Current-Based Temporal Proteomic Profiling of Influenza A Virus Infected Mouse Lungs Revealed Underlying Mechanisms of Altered Integrity of the Lung Microvascular Barrier. ***Journal of Proteome Research.*** Feb 5;15(2):540-53.

27. Zhang T, Shen S, Qu J, Ghaemmaghami S. (2016) Global Analysis of Cellular Protein Flux Quantifies the Selectivity of Basal Autophagy. ***Cell Rep*****.** Mar 15;14(10):2426-39.

28. Zhang T, Ghaemmaghami S.(2016) Auophagic Punctum: Global Analysis of Cellular Protein Flux Quantifies the Selectivity of Basal Autophagy. ***Autophagy***. Aug 2;12(8):1411-2.

29. Ghaemmaghami S. (2016) Biology and genetics of PrP prion strains. (invited chapter in “Prion Diseases” Edited by: Stanley Prusiner, Cold Spring Harbor Laboratory Press)

30. Welle K., Zhang T., Hyrohorenko J., Shen S., Qu J., Ghaemmaghami S. (2016) Time-resolved analysis of proteome dynamics by TMT-SILAC hyperplexing ***Mol. Cel. Proteomics*** (Mol Cell Proteomics, Oct 20, in press)