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Education

- 1995-1997 Postdoctoral fellow, Section of Leukocyte Biology
Dept. of Pediatrics, Baylor College of Medicine, Houston, TX
Research topic: "Neutrophil cell adhesion dynamics under fluid shear"
Mentors: Scott I. Simon, C. Wayne Smith
- 1991-96 Ph.D., Bioengineering/Chemical Engineering
Rice University, Houston, TX.
Dissertation title: "Mechanisms of homotypic lymphocyte aggregation and cell motility induced by activation of VLA integrins"
Advisor: Kyriacos Zygourakis
- 1987-91 B.Tech., Chemical Engineering,
Indian Institute of Technology, Delhi, India

Positions and Honors

Positions and Employment

- 1991-1995 Research Assistant, Department of Chemical Engineering, Rice University

	Houston, TX
1995-1997	Research Associate, Department of Pediatrics, Baylor College of Medicine Houston, TX
1997-2003	Assistant Professor, Department of Chemical & Biological Engineering, University at Buffalo, State University of New York, Buffalo, NY
2002-2010	Co-director, Center for Biomedical Engineering University at Buffalo, State University of New York, Buffalo, NY
2003-2008	Associate Professor, Department of Chemical & Biological Engineering, University at Buffalo, State University of New York, Buffalo, NY
2006-present	Faculty, NY State Center for Excellence in Bioinformatics and Life Sciences, University at Buffalo, State University of New York, Buffalo, NY
2005-2008	Director of Graduate Studies, Chemical and Biological Engineering University at Buffalo, State University of New York, Buffalo, NY
2008-present	Professor, Department of Chemical and Biological Engineering University at Buffalo, State University of New York, Buffalo, NY
2008-present	Professor, Dept. of Biomedical Engineering University at Buffalo, State University of New York, Buffalo, NY
2016-present	Faculty member, UB Clinical & Translational Research Center, Buffalo, NY
2017-present	Research Professor, Department of Medicine, Jacobs School of Medicine and Biomedical Sciences University at Buffalo, State University of New York, Buffalo, NY

Honors and Selected Professional Activities

1991 -1992	Rice University Fellowship
1995	Graduate Student Symposium Winner, Rice University
1996	Sigma Xi Scientific Research Society Dissertation Recognition
1999	Reifler Award, State University of New York at Buffalo
2001	1 of 100 Members of the Upstate Alliance of Innovators, Western New York
2002	Exceptional Scholar Program: Young Investigator Award, SUNY at Buffalo
2003-2015	Honoree, Science, Technology Transfer and Economic Outreach (STOR) Office and The SUNY Research Foundation on three occasions (for issued and licensed patents)
2004	Independent Scientist Award, National Heart, Lung and Blood Institute, NIH
2009-2012	Full member, NIH standing study section on Hypertension and Microcirculation
2010, 2018	Invited speaker, Annual meeting of the Society of Glycobiology
2014	Invited speaker, Joint Meeting of the Society for Glycobiology and the Japanese Society for Carbohydrate Research
2011	Exceptional Scholar Program: Sustained Achievement Award, University at Buffalo
2012	Elected Fellow, American Institute for Medicine and Biological Engineering
2015	SUNY Chancellor's Award for Excellence in Scholarship and Creative Activities
2018-present	Discussion leader, Symbol Nomenclature for glycans (SNFG) www.ncbi.nlm.nih.gov/glycans/snfg.html
2017-present	Member, Glycan Informatics Advisor group NCBI-Glycans (https://www.ncbi.nlm.nih.gov/glycans/)

2018	Jacob F. Schoellkopf Medal, WNY American Chemical Society (for accomplishments & continuing achievements in the chemical sciences)
2019	Elected Fellow, Biomedical Engineering Society
2021	Speaker, Joint Warren and Beilstein Symposium on Glycosciences, Grenoble (virtual)
2022	Invited Symposium Speaker, ASBMB Annual Meeting/EB2022, Philadelphia, PA
2022	Invited Speaker, American Chemical Society, San Diego, CA

Editorial Service

- Associate Editor, Annals of Biomedical Engineering (2009-present)
- Associate Editor, Frontiers in Computational Physiology and Medicine (2011-present)
- Associate Editor, Frontiers in Biomechanics (2013-present)
- Editorial Working Group, The Encyclopedia of Glycobiology (eGlyc) project (2021-present)
- Editorial Board Member, Cell Communication and Adhesion (2001-2006)
- Guest Editor for special Issue of Annals of Biomedical Engineering (2008)
- Editorial Board, Journal of Glycomics & Lipidomics (2010-present)
- Editorial Board, Cells (2020-present)
- *Ad hoc* reviewer for several journals, including but not limited to: Annals of Biomedical Engineering, American J. of Physiology– Cell Physiology, American Journal of Physiology – Heart, BBA-General Subjects, Analytical Biochemistry, Biochemical Pharmacology, Biophysical Journal, Biotechnology Progress, Biomaterials, Biomechanics & Modeling in Mechanobiology, Biomacromolecules, Biotechnology and Bioengineering, Biorheology, BMC-Systems Biology, Blood, BMC-Bioinformatics, Cell Reports, Cell Communication and Adhesion, Cell and Molecular Bioengineering, Colloid and Surface B, Circulation Research, Clinical Chemistry, Carbohydrate Research, European Biophysics Journal, various Frontiers journals, Integrative Biology, Glycobiology, Immunological Reviews, iScience, Journal of American Chemical Society, Journal of Biomechanics, Journal of Biological Chemistry, Journal of Biomechanical Engineering, Journal of Cell Sciences, Journal of Glycomics and Lipidomics, Journal of Immunology, Journal of Laboratory and Clinical medicine, Journal of Leukocyte Biology, Journal of Thrombosis and Haemostasis, Langmuir, Journal of Periodontology, Lab-on- a-chip, Mathematical Bioscience, Nutrition, Nature Communications, Nature Methods, Polymer Composite, PLoS One, Pharmaceutical Research, Physical Review Letters, various journals of the RSC (Royal Society of Chemistry), Science, Science Advances, Scientific Reports, Thrombosis Research, Thrombosis and Hemostasis, Systems Biology and Medicine (Wiley Interdisciplinary Reviews)

Grant Reviewer

2005-2007	NIH Reviewer for various panels related to: Bioengineering Research Partnership
2012-15	NHLBI Reviewer for Systems Biology Collaborations
2007-2009	Ad Hoc member, Microcirculation and Hypertension study section
2009-2012	Standing member, Microcirculation and Hypertension study section

2011-present NIH Ad Hoc Reviewer for various panels related to: Bioengineering Research Partnership panels (2005-2006), NHLBI Systems Biology panels (2006-2007, 2012-2015); Microcirculation and Hypertension (2007-2009); National Institutes of Health Special Emphasis Panels: ZRG1 HM (02) (2011); ZRG1 CVRS-F (02) (2011); ZRG1 IDM-V-02 (2013); ZRG1 VH-D (50) (2013); ZRG1 VH-D (50) (2013); ZRG1 VH-D (55) (2014); ZRG1 VH-D (55) (2014); ZRG1 VH-D55 (2015); BST-U(50) (2015); Hemostasis and Thrombosis (HT, 2015, 2017-2019); ZAI1-PA-I J1 (2017), ZRG1 BST-H(40) (2018), Enabling Bioanalytical and Imaging Technologies (EBIT, 2018); Therapeutic Approaches to Genetic Disease (TAG, 2018); ZRG1 PSE-H 70 (2019), Human Immunology Project Consortium (2021).

2000-present National Science Foundation

2006 Israel Science Foundation

2006 Ireland Health Research Board

2013 Baker Foundation

2013 Biotechnology and Biological Sciences Research Council, UK

2016 Swiss National Science Foundation

2019 Canada Foundation for Innovation

Professional Memberships:

American Institute of Chemical Engineers (AIChE)
 Biomedical Engineering Society (BMES)
 ASBMB, Federation of American Societies of Experimental Biology (FASEB)
 American Association for the Advancement of Science (AAAS)
 International Society of Thrombosis and Haemostasis (ISTH)
 Society for Glycobiology (SFG)
 Human Proteome Organization (HUPO)

Professional Service:

- Biomedical Engineering Society, Affiliations Committee (2009-2010)
- Abstract Reviewer and Session Chair for various sessions of the Biomedical Engineering Society Annual Meeting (2010-present)
- Biomedical Engineering Society meeting session chair: Sessions in Cell Adhesion; Systems Proteomics and Hemodynamics and vascular mechanics.
- American Institute of Chemical Engineers (AIChE): co-organizer and Session Chair for "Applied Mathematics in Bioengineering" at the Annual Meeting in the years 1997, 1998, 2002 and 2006.
- AIChE, Co-organizer and Session Chair for "Receptor-Mediated Processes", 2000 AIChE, Co-organizer and Session Chair for "Effect of stimuli on cells", 2001.
- AIChE, Co-organizer and Session Chair for "Cell Adhesion and Migration", 2007.
- AIChE, Co-organizer and Session Chair for "Micro-scale technologies", 2014
- Co-organizer, UB Chemical Engineering Graduate Research Symposium, 1998-2002.
- Curating various glycoscience resources in collaboration with a team of investigators worldwide from Europe, Asia, America and Australia

Research interests:

I work on various projects related to Molecular, Cellular, tissue and Computational Bioengineering, both basic science investigations and translational research. The following is a brief description of some of my research interests:

Systems Glycobiology: A vast majority of proteins secreted from mammalian cells are glycosylated. These carbohydrates absolutely control or fine-tune many biological processes including protein circulation half-life, molecular recognition, development, normal physiology and major human ailments including inflammation, thrombosis and tumorigenesis. While traditional biochemical studies attempt to dissect the pathways regulating glycan biosynthesis and biological processes one-at-a-time, our studies attempt a systems approach that includes large scale experimentation coupled with mathematical modeling. Commonly, the high-throughput experiments involve: i. the use of CRISPR-Cas9 tools for genome editing to perturb glycosylation-related pathways, ii. protein engineering to create synthetic reporter probes of glycosylation, iii. mass spectrometry to follow changes in the glycoproteoforms upon system perturbation, and iv. Next Generation Sequencing (NGS) to assay gene regulatory pathways. Mathematical analysis tools are developed to aid data analyses including software tools for tandem-mass spectrometry glycoproteomics data analysis (called 'GlycoPAT'); network modeling tools for various types of glycosylation related pathways (called 'GNAT'); and standard bioinformatics methods to integrate knowledge on transcript changes to cell surface carbohydrate alterations. Many of the software are released open-source at our group website, VirtualGlycome.org.

Thrombosis and Hemostasis: The goal of this project is to develop novel methods to control coagulation in blood, and to define technologies to control the balance between clotting and bleeding. In particular, the focus is on Von Willebrand factor structure-function studies, protein biophysics and self-association function, and arterial and microvascular mouse models of thrombosis. These studies examine the effect of physiological and pathological hydrodynamic shear on a variety of clotting phenomena that occur in human blood. This includes acquired von Willebrand Syndrome (AVWS) that is an ever-increasing complication associated with medical devices like ECMOs and LVADs. Additionally, in this project, we also study the impact of coagulation protein glycosylation on protein therapeutic efficacy and circulatory half-life.

Inflammation biology: The studies analyze the basic biological processes regulating human leukocyte adhesion to vascular endothelial cells that line blood vessels. Besides identifying the roles of glycans, carbohydrate binding lectins and integrins in this multi-step cell adhesion cascade, a major effort of this project also focusses on metabolic strategies to perturb leukocyte O- and N-linked glycans. To this end, a series of chemical monosaccharide and substrate analogs have been developed, which when fed to white blood cells, reduce inflammatory leukocyte recruitment in mouse models of acute inflammation. Thus, these small molecules represent future anti-inflammatory drugs. Some of these novel chemical entities are currently being used in studies of SARS-CoV-2/COVID-19 research.

Regenerative medicine: I am interested in developing cell adhesion engineering/CAE strategies to target stem cells and stem cell derived exosomes to the heart in models of myocardial infarction. To this end, we perform the glycan engineering of mesenchymal stem cells (MSCs) and cardiosphere-derived cells (CDCs). Methods to improve the targeting of these modified stem cells to ischemic sites

are developed in a large-animal swine model. Advanced imaging methods are also applied as part of this project to monitor and optimize the targeted delivery of stem cell therapeutics. In addition to performing a number of investigations related to stem cells, we also have a broad focus on stem cell derived exosomes (synthesis, design and drug loading) currently for application in small animal models. I also train a number of young stem cell scientists as part of the leadership of the University at Buffalo Stem Cells in Regenerative Medicine training program (SCiRM).

University Services:

- *Member*, Founding member and advisory committee member, Department of Biomedical Engineering, State University of New York at Buffalo
- *Member*, Selection of proposals for Pew Research Grant competition, 2005.
- *Member*, UB IMPACT grant review panel, 2014
- *Member*, IRDF UB Scholar review panel, 2007, 2008.
- *Member*, Sterbutzl research grant panel, 2005-2006.
- *Mentor*, Students undertaking special majors in Bioengineering at UB (2000-2005).
- *Laboratory rotation supervisor*, Medical Scientist Training Program (MD/PhD), Office of Research and Biomedical Education, University at Buffalo, SUNY (2005-present).

Faculty Services:

- *Faculty mentor* for Ding Xu (Department of Oral Biology) and Natesh Parashurama (2015-present)
- *Adjudication Pool*, School of Engineering and Applied Sciences (2017-2019)
- *Faculty Search Committee Chair*, Department of Chemical and Biological Engineering (2016-2017, 2017-2018)
- *Member*, Faculty Promotion Committee for evaluating promotion to full professor (2013-present)
- *Chair*, Chemical and Biological Engineering, Qualifying Exam committee (2013-2014)
- *Faculty Search Committee Chair*, Department of Chemical and Biological Engineering (2013-2014)
- *Faculty Search Committee Chair*, Department of Biomedical Engineering (2010-2011)
- *Faculty Search Committee Member*, Department of Biomedical Engineering (2009-2010)
- *Co-director*, Center for Biomedical Engineering, School of Engineering and Applied Sciences, University at Buffalo (2002-present)
- *Member*, Faculty Promotion Committee for evaluating tenure cases (2007-2010)
- *Member*, Biomedical Engineering Department Design Committee (2007)
- *Member*, CBE Graduate Integrity Committee (2007-2011)
- *Member*, Integrated Nanostructured Systems Committee (2006-2007)
- *Member*, Center for Excellence in Bioinformatics Faculty Search Committee (2002-2003)
- *Faculty Search Committee Member*, Department of Chemical Engineering, University at Buffalo (2001)
- *Director of Graduate Studies*, Department of Chemical Engineering, University at Buffalo (1999-2000, 2005-2006, 2007-2008)
- *Member*, Graduate APC, School of Engineering and Applied Sciences, University at Buffalo

(1999-2000, 2005-2006, 2007-2008)

- *Member, Graduate Admissions Committee*, Department of Chemical Engineering, University at Buffalo (1997- present)
- *Member, Transport Ph.D. Qualifier Committee*, Department of Chemical Engineering, University at Buffalo (1998- present)
- *Member of Department Safety Committee*, Department of Chemical Engineering, University at Buffalo (1998-2000)
- *Participant*, School of Engineering and Applied Sciences and UB open day activities (1997- 2006)
- *Co-organizer*, Department of Chemical Engineering, Graduate Research symposium, University at Buffalo (1998- 2003)
- *Member*, Pre-doctoral student training committee, Center for drug discovery and experimental therapeutics (2000)

Bibliography

Publications: Open source software

We maintain three software related to Systems Glycobiology at our web server: www.VirtualGlycome.org. These have each been downloaded thousands of times by members of the scientific community:

S1. DrawGlycan-SNFG: Used for sketching/rendering glycans using IUPAC condensed input strings. This program is directly linked to NCBI pages related to the Symbol Nomenclature For Glycans (SNFG; <https://www.ncbi.nlm.nih.gov/glycans/snfg.html>).

Availability: <https://virtualglycome.org/drawglycan/>
<http://drawglycan.sourceforge.net>
<https://github.com/kaichengub/DrawGlycan-SNFG>

S2. GlycoProteomics Analysis Toolbox (GlycoPAT): Program for high-throughput glycoproteomics mass spectrometry data analysis using tandem-MS data.

Availability: <https://virtualglycome.org/glycopat/>
<http://glycopat.sourceforge.net>
<https://github.com/kaichengub/GlycoPAT>

S3. Glycosylation Network Analysis Toolbox (GNAT): Generating carbohydrate biosynthesis reaction networks from mass spectrometry and transcriptomics data interpretation.

Availability: <https://virtualglycome.org/gnat/>
<http://gnatmatlab.sourceforge.net>

Publications: Full-length Refereed Journal Articles

1. Kawahara, R., Chernykh, A., Alagesan, K., Bern, M., Cao, W., Chalkley, R.J., Cheng, K., Choo, M.S., Edwards, N., Goldman, R., Hoffmann, M., Hu, Y., Huang, Y., Kim, J. Y., Kletter, D., Liquet-Weiland, B., Liu, M., Mechref, Y., Meng, B., Neelamegham, S., Nguyen-Khuong, T., Nilsson, J., Pap, A., Park, G.W., Parker, B.L., Pegg, C.L., Penninger, J.M., Phung,

- T.K., Pioch, M., Rapp, E., Sakalli, E., Sanda, M., Schulz, B.L., Scott, N.E., Sofronov, G., Stadlmann, J., Vakhrushev, S.Y., Woo, C.M., Wu, H.-Y., Yang, P., Ying, W., Zhang, H., Zhang, Y., Zhao, J., Zaia, J., Haslam, S.M., Palmisano, G., Yoo, J.S., Larson, G., Khoo, K.-H., Medzihradsky, K.F., Kolarich, D., Packer, N.H., Thaysen-Andersen, M., Community Evaluation of Glycoproteomics Informatics Solutions Reveals High-Performance Search Strategies of Serum N- and O-Glycopeptide Data, *Nature Methods*, **18**: 1304-16 (2021). www.nature.com/articles/s41592-021-01309-x
2. Ugonotti, J., Kawahara, R., Loke, I., Zhu, Y., Chatterjee, S., Tjondro, H.C., Sumer-Bayraktar, Z., Neelamegham, S., Thaysen-Andersen, M. N-Acetyl- β -D-hexosaminidases mediate the generation of paucimannosidic proteins via a putative non-canonical truncation pathway in human neutrophils *Glycobiology*. 2021 Oct 18:cwab108. doi: 10.1093/glycob/cwab108.
 3. Momeni A, Eagler L, Lo CY, Weil BR, Canty JM Jr, Lang JK, Neelamegham S. Neutrophils aid cellular therapeutics by enhancing glycoengineered stem cell recruitment and retention at sites of inflammation. *Biomaterials*. 2021 Sep;276:121048. doi: 10.1016/j.biomaterials.2021.121048.
 4. Hombu, R., Neelamegham, S., Park, S. Cellular and Molecular Engineering of Glycan Sialylation in Heterologous Systems, *Molecules*, **26**(19): 5950, 2021. <https://doi.org/10.3390/molecules26195950>
 5. Aggarwal, S., Qi, X., Neelamegham, S., Gunawan, R. Compartmental Glycosylation Flux Analysis, *IFAC-PapersOnline*, **54**(3):287-93, 2021. <https://doi.org/10.1016/j.ifacol.2021.08.256>
 6. Mahajan S, Jacob A, Kelkar A, Chang A, Mcskimming D, Neelamegham S, Quigg RJ, Alexander JJ. Local complement factor H protects kidney endothelial cell structure and function. *Kidney Int*. 2021 Oct;100(4):824-836. doi: 10.1016/j.kint.2021.05.033.
 7. Neelamegham S., The symbol nomenclature and other glycan notations, *invited review* (submitted), 2021.
 8. Groth, T., Neelamegham, S., A systems based framework to computationally predict putative transcription factors and signaling pathways regulating glycan biosynthesis, *Beilstein J Org Chem*. 2021 Jul 22;17:1712-1724. doi: 10.3762/bjoc.17.119.
 9. Wang, S.S., del Solar, V., Yu, X., Antonopoulos, A., Friedman, A.F. Agarwal, K., Garg, M., Ahmed, S.M., Addya, A., Nasirikenari, M., Lau, J.T., Dell, A., Haslam, S.M., Sampathkumar, S.G., Neelamegham, S. Efficient Inhibition of O-glycan biosynthesis using the hexosamine analog Ac₆GalNTGc. *Cell Chemical Biology*, 2021 May 20;28(5):699-710.e5. doi: 10.1016/j.chembiol.2021.01.017.
 10. Zhu, Y., Groth, T., Kelkar, A., Zhou, Y., Neelamegham, S., A GlycoGene CRISPR-Cas9 lentiviral library to study lectin binding and human glycan biosynthesis pathways. *Glycobiology*. 2021 Apr 1;31(3):173-180. doi: 10.1093/glycob/cwaa074
 11. Kumar S, Jiang D, Sun B, Seeley KV, Engle JW, Sia Z, He X, Neelamegham S, Cai W, Lovell JF. Labeling of Erythrocytes by Porphyrin-Phospholipid *Adv Nanobiomed Res*. 2021 Jan;1(1):2000013. doi: 10.1002/anbr.202000013. Epub 2020 Oct 16.
 12. Sanchez H, Hopkins D, Demirdjian S, Gutierrez C, O'Toole GA, Neelamegham S, Berwin B. Identification of cell-surface glycans that mediate motility-dependent binding and internalization of *Pseudomonas aeruginosa* by phagocytes *Mol Immunol*. 2021 Mar;131:68-77. doi: 10.1016/j.molimm.2020.12.012.
 13. Kellman BP, Zhang Y, Logomasini E, Meinhardt E, Godinez-Macias KP, Chiang AWT, Sorrentino JT, Liang C, Bao B, Zhou Y, Akase S, Sogabe I, Kouka T, Winzeler EA, Wilson IBH, Campbell MP, Neelamegham S, Krambeck FJ, Aoki-Kinoshita KF, Lewis NE A consensus-based and readable extension of *Li* near *Co* de for *R* reaction *R*ules (LiCoRR) *Beilstein J Org Chem*. 2020 Oct 27;16:2645-2662. doi: 10.3762/bjoc.16.215. eCollection 2020.
 14. Yang, Q, Hughes TA, Kelkar A, Yu X, Cheng K, Park S, Huang WC, Lovell JF, Neelamegham

- S. Inhibition of SARS-CoV-2 viral entry upon blocking N- and O-glycan elaboration *Elife*. 2020 Oct 26;9:e61552. doi: 10.7554/eLife.61552.
15. Del Solar V, Gupta R, Zhou Y, Pawlowski G, Matta KL, Neelamegham S. Robustness in glycosylation systems: effect of modified monosaccharides, acceptor decoys and azido sugars on cellular nucleotide-sugar levels and pattern of N-linked glycosylation. *Mol Omics*. 2020 Aug 1;16(4):377-386. doi: 10.1039/d0mo00023j
 16. Sun B, Chitgupi U, Li C, Federizon J, Zhang C, Ruszaj DM, Razi A, Ortega J, Neelamegham S, Zhang Y, Lovell JF. Drug Delivery: Surfactant-Stripped Cabazitaxel Micelles Stabilized by Clotrimazole or Mifepristone (Adv. Therap. 3/2020). *Advanced Therapeutics*. 2020;3(3). doi: 10.1002/adtp.202070007
 17. Cheng K, Pawlowski G, Yu X, Zhou Y, Neelamegham S. DrawGlycan-SNFG & gpAnnotate: Rendering glycans and annotating glycopeptide mass spectra *Bioinformatics*. 2019 Nov 9:btz819. doi: 10.1093/bioinformatics/btz819.
 18. Kelkar, A., Zhu, Y., Stolfa, G., Stablewski, A.B., Singhi, N., Nemeth, M., Neelamegham, S. "Doxycycline dependent self-inactivating of CRISPR-SpCas9 to temporally regulate on- and off-target editing", *Molecular Therapy*, 28(1):29-41, 2020.
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 22. Zhang, C., Kelkar, A., Neelamegham, S. "Von Willebrand Factor self-association is regulated by the shear dependent unfolding of the A2-domain", *Blood Adv*. 9;3(7):957-968, 2019.
 23. Weil, B.R., Neelamegham, S. "Selectins and Immune Cells Regulating Acute Myocardial Infarction and Post-Infarction Ventricular Remodeling: Pathophysiology and Novel Treatments (Invited review)", *Front Immunol*, Feb 27;10:300, 2019. doi: 10.3389/fimmu.2019.00300.
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29. Gogia, S., Kelkar, A., Zhang, C., Dayananda, K. M., Neelamegham, S., Role of calcium in regulating the intra- and extra-cellular cleavage of von Willebrand factor by the protease ADAMTS13. *Blood Advances*; 1(23):2063-2074, 2017.
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Publications: Book Chapters

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116. Neelamegham, S. "The symbol nomenclature and other glycan notations", Glycoinformatics: Methods and Protocols, Second Edition, Ed: Thomas Lutteke, Ph.D. (invited), in press, 2021.
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118. "Chapter 52, Glycoinformatics" in the Essentials of Glycobiology (NCBI Text, 3rd Edition Update, forthcoming in 2021), Sriram Neelamegham, with co-authors Nicolle H. Packer, Matthew P. Campbell, Kiyoko F. Aoki-Kinoshita, Frederique Lisacek and William S. York.
119. "Online Appendix 1B. Symbol Nomenclature for Glycans (SNFG)" in the Essentials of Glycobiology (NCBI Text, 3rd Edition Update, forthcoming in 2021), Sriram Neelamegham, with co-author Ajit Varki
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Publications: Patents

1. "Anti-Viral Compositions and Methods of Using Same" Neelamegham, S., Kelkar, A., Hughes, T.A., Yang, Q., US 63/079,667, 2020
2. Fluorescence resonance energy transfer (FRET) based measurement of ADAMTS-13 activity", Neelamegham, S., Dayananda, K. M., US provisional patent 61/351318 (2010), Non-provisional US patent Application No. 13/701,930.
3. "Methods for Synthesis of Sialylated products using reversible sialylation", Matta, K.L., Chandrasekaran, E.V., Neelamegham, S., Xue, J. US patent 8,278,072 (2012).
4. "Extraction of liquid from absorbent packaging", Alexandridis, P., and Neelamegham, S., U.S. patent 6,589,797 (2003) [licensed to Technicor, Inc., Buffalo, NY].
5. "Extraction of liquid from absorbent packaging", Alexandridis, P., and Neelamegham, S., U.S. patent 7,008,797 (2006) [licensed to Technicor, Inc., Buffalo, NY].
6. "Functional antibodies that recognize the D'D3 domain of human VWF", Neelamegham, S., S. Madhabushi, K. Rittenhouse Olson, US Provisional patent, July 20, 2011.
7. "Metabolic inhibitor of selectin mediated cell adhesion" Neelamegham, S. Marathe, D.D., Buffone, A., Lau, J.T. Matta, K.L., US provisional patent 61/102,600 (2008).
8. "Novel family of selectin antagonists", S. Neelamegham and K. Matta, Provisional U.S. patent 60/670,163.

Publications: Conference proceedings and meeting abstracts

These data are not collected since they are too many of them to track systematically.

Research Support (current)

1. R01HL103411 (single PI: Neelamegham) 09/05/2011 – 02/01/2026

National Institutes of Health/NHLBI

"Systems Biology of Glycosylation"

Goals: This R01 is part of the NHLBI Systems Biology program. It aims to develop mathematical modeling methods and complementary experiments to study cellular glycosylation reaction networks. The idea is to develop a framework for mathematical modeling of glycosylation processes, to develop hypotheses *in vitro* using human blood and to test them in models of acute inflammation. Development of genome editing methods, single-cell multi-omics, and high-throughput mass spectrometry is part of this project.

Role: PI (with Jun Qu)

Budget: Neelamegham lab direct cost ~\$325,000/year (total cost: \$549,809/year)

2. Pilot project grant funded by NCATS/UB-CTSI 01/01/2022-12/31/2022

"A SARS-CoV-2 virus like particle (VLP) technology platform"

Goal: To support COVID-19 research in BSL-2 setting, mouse and mini-pig studies

Role: PI

Budget: Neelamegham lab direct cost \$46,500

3. 1R21GM126537-01 (Single PI: Neelamegham) 12/15/2017-11/30/2021

National Institutes of Health/ NIGMS

“Synthetic glycan biomarkers: Novel reporters of cell metabolism”

Goal: To develop a technology called ‘synthetic glycan biomarkers’ that will enable the longitudinal tracking of metabolic changes in live animal blood samples

Role: PI (single investigator grant).

Budget: \$ 0.45 million over 2 years. Neelamegham direct cost ~\$137,500/year

4. 1R21GM133195-01 (Single PI: Neelamegham) 05/01/2019-04/30/2022

National Institutes of Health/ NIGMS

“High content glycomics analysis using next generation sequencing technology”

Goal: To develop a novel strategy for single cell glycomics

Role: PI (single investigator grant)

Budget: \$ 0.45 million over 2 years. Neelamegham direct cost ~\$137,500/year

5. 1R21 GM139160-01-A1 (MPI: Park, Neelamegham) 09/15/2020-08/31/2022

National Institutes of Health/ NIGMS

“Engineering of glycosyltransferases to obtain glycan binding proteins”

Goal: To perform molecular engineering of glycosyltransferases using rational design

Role: co-PI

Budget: \$ 0.45 million over 2 years. Neelamegham direct cost ~\$60,000/year

Research Support (pending)

6. 1R01CA.... (PI: Ponnusamy, co-I, Neelamegham) 07/01/2022-06/30/2027

National Institutes of Health/NCI

[likely to be funded]

“Truncated O-glycan-dependent mechanisms inducing metastatic dissemination in pancreatic cancer”

Goal: To examine the role of O-glycosylated mucinous proteins in pancreatic cancer metastasis

Role: co-I

Budget: \$52,000 direct cost/year requested for 5 years

7. NOSI: R01HL103411S1 (PI: Neelamegham) 08/01/2022-07/31/2022

National Institutes of Health/NHLBI

“Application of machine/deep learning to the systems biology of glycosylation”

Goals: Supports the development of machines/deep learning for Glycoscience and other Biomedical applications.

Role: PI

Budget: \$200,000/year (total direct cost)

Training grants

8. New York State Stem Cell Science (NYSTEM) Training Grant 2016-2021

Total Costs: \$1,859,403

“Stem Cells in Regenerative Medicine (SCiRM)”

Role: co-PI, member of steering committee

P.I.: S.T. Andreadis

9. 1K12 HL141954 (Hoffmeister, K.) 07/01/2018-06/30/23

National Institutes of Health/NHLBI

“Glycans in blood homeostasis and disease”

Role: co-I/Mentor

10. T32 DE023526 (Scannapieco/Ruhl) 07/01/13-06/30/23

National Institutes of Health /NIDCR

“Advanced Training in Oral Biology”

Role: co-I, Mentor

11. T32GM099607 (Knight) 07/01/2018-06/30/22

National Institutes of Health/NIGMS “Anesthesiology Research Training Program”

Role: co-I, Mentor

Previously funded research grants

1. Agency: American Heart Association

161RG27770071 Neelamegham (PI)

Title: “Targeting cellular therapeutics in a pre-clinical model of myocardial infarction”

Period: 1/1/2016 – 12/31/2019

Goals: High-risk, high-reward pilot study grant supported through the AHA ‘Innovative Research Grant’ mechanism. The overall goal is to determine if stem cells engineered to have altered cell adhesion properties display enhanced homing and therapeutic efficacy in a myocardial infarction swine model.

Role: PI (Canty serves as co-I)

Budget: \$200,000 (total cost) Neelamegham direct cost ~\$88,000/year

2. Agency: National Institutes of Health/ NCI

1U01CA221229-01(Mahal)

Title: “GlycoMiR: Mapping the miRNA-glycogene interactome”

Period: 7/1/2017-6/30/2020

Goals: To map microRNA:glycogene interactions and create GlycoMiR, a database of MicroRNA: glycogene interactions.

Role: co-Investigator (Mahal is PI)

Neelamegham direct cost ~\$50,000/year

3. Agency: Palleon Pharmaceuticals

Research contract (Neelamegham)

12/1/2018-11/30/2019

Title: “A Systems Biology Approach to Predict Glycan Expression Patterns on Clinical Tumor Samples”

Goal: Bioinformatics data analysis to aid patient stratification

Role: PI (single investigator grant)

Budget: \$74,896 (total cost for 1 year, with potential to extend)

4. Agency: National Heart Lung and Blood Institute PO1 grant HL107146

Title: “Regulation of Lactosaminyl Glycan Biosynthesis in Hematopoietic Cells”

Period: 07/1/2011-05/31/2018

Amount awarded: \$17.5 Million total cost (\$0.65million to Neelamegham lab).

Role: Neelamegham is co-I for project 2.

Description: This is a multi-investigator PO1 grant submitted from the Harvard Medical School in response to the Program of Excellence in Glycosciences RFA (HL-10-026). Here, as part of project 2, the Neelamegham lab develops mathematical analysis methods to support the experimental work performed by Dr. Joseph Lau (Roswell Park Research Institute) in project 2. The lead PI for the entire grant application is Dr. Robert Sackstein, Harvard.

5. *Agency:* National Heart Lung and Blood Institute RO1 grant HL103411
Title: "Systems Biology of Glycosylation"
Period: 09/05/2011-08/31/2017
Amount awarded: \$2,056,913 (direct cost) and \$2,769,497 (total cost). SN lab annual direct cost: ~\$225,000.
Role: SN serves as PI. Co-Investigators include: Qu (Pharmaceutical Sciences, UB), Lau (Molecular and Cellular Biology, RPCI), Matta (Cancer Biology, RPCI) and Thanavala (Immunology, RPCI).
Description: This multi-investigator grant applies modeling to study cellular glycosylation reaction networks. The idea is to develop hypotheses using mathematical modeling and to test them in animal models of acute and chronic inflammation to study end effector cell function. The goal is also to develop generalized systems biology based standards and application program interfaces (APIs) for the field of Systems Glycobiology.
6. *Agency:* National Heart Lung and Blood Institute RO1 grant HL63014, year 10-13
Title: "Selectin mediated cell adhesion under hydrodynamic shear"
Period: 04/01/2011-03/31/2016
Amount awarded: \$725,000 (direct cost) and \$1,118,389 (total cost). SN lab annual direct cost ~\$175,000
Role: SN is PI. Matta (Cancer Biology, RPCI) serving as co-Investigator.
Description: This project develops small molecule antagonists and examines the potential role of reverse sialylation in regulating selectin mediated leukocyte-endothelium binding.
7. *Agency:* UB IMPACT award for pilot multi-disciplinary research support
Title: "Strategies to Enhance Stem Cell Homing to Sites of Damage following Myocardial Infarction"
Period: 05/2015-5/2016
Direct cost: \$35,000
Role: SN is PI with John Canty (Medicine)
Description: Project aims to modify stem cell adhesion properties for delivery to infarcted heart. This is a pilot grant meant to support collection of Prelim. Data for additional extramural grant applications.
8. *Agency:* National Institute of Dental & Craniofacial Research RO1 grant DE023105
Title: "Regulation of skeletal development and homeostasis by IFT protein"
Period: 06/01/2014-05/31/2016
Amount awarded: \$40,000 (direct cost /year) for SN laboratory
Role: SN is co-investigator for studies related to effect of fluid shear stress on cellular differentiation. PI of grant is Shuying Yang.
Description : IFT is essential for skeletal development and homeostasis. The aim of this work is to thoroughly investigate the relationship of IFT with the bone development using proteomics and genetic methods.
9. *Agency:* National Institutes of Health/NCRR 1S10R028863-01
Title: "Computing Infrastructure to advance biomedical research "
Period: 06/24/2010-08/23/2011
Amount awarded: \$2,566,410
Role: major user/co-I
10. *Agency:* American Heart Association
Title: "Metabolic Regulation of Selectin Ligand Glycosylation"
Period: 07/2010-06/2012

Amount awarded: \$44,000 (direct and total cost)

Role: Pre-doctoral Fellowship awarded to support Chi Lo, a graduate student in SN's laboratory.

11. *Agency:* American Heart Association

Title: "Domain level interactions regulating blood protein Von Willebrand Factor function"

Period: 07/2010-06/2012

Amount awarded: \$44,000 (direct ad total cost)

Role: Pre-doctoral Fellowship awarded to support Sri R. Madhabushi, a graduate student in SN's laboratory.

12. *Agency:* NY State Stem Cell Initiative (NYSTEM) N08G-013

Title: "Glyan engineering of stem cells"

Period: 01/09-12/11

Amount awarded: \$200,000 (direct cost) and \$240,000 (total cost) *Role:* SN is sole-PI.

13. *Agency:* National Heart Lung and Blood Institute RO1 grant HL63014-08S1

Title: "ARRA Supplement: Selectin mediated cell adhesion under hydrodynamic shear"

Period: 06/08/2009-08/31/2011

Amount awarded: \$ 20,478 (total cost)

Role: SN is PI. This is a supplement to support undergraduate summer research.

14. *Agency:* National Heart Lung and Blood Institute RO1 grant HL77258 (year 1-4)

Title: "Von Willebrand factor structure and function"

Period: 05/01/2006-04/30/2011

Amount awarded: \$1,519,526 (total cost) and \$1,000,000 (direct cost)

Role: SN is PI. Alexandridis is co-investigator (Neelamegham portion: ~\$200,000 annual direct cost)

15. *Agency:* National Heart Lung and Blood Institute RO1 grant HL63014 (year 5-9)

Title: "Selectin mediated cell adhesion under hydrodynamic shear"

Period: 12/1/2005-11/30/2010

Amount awarded: \$1,168,470 (total cost) and \$775,000 (direct cost)

Role : SN is sole-PI.

16. *Agency:* National Institute of Health, KO2 HL076211-01

Title: "Fluid Forces Regulating Protein Structure and Function"

Period: 04/04-03/09

Amount awarded: \$530,718 (total cost) and \$491,406 (direct cost)

Role: PI, This is a single investigator grant

17. *Agency:* National Institute of Health, RO1 HL63014 (year 1-4)

Title: "Neutrophil Adhesion mechanics under shear"

Period: 04/01-03/06

Amount awarded: \$763,889 (total cost) and \$525,000 (direct cost)

Role: SN is sole-PI.

18. *Agency:* National Institute of Standards and Testing (NIST Center for Neutron Research)

Title: "Protein conformation change under fluid flow".

Period: 09/04-08/05

Amount awarded: This award provides 3-days small-angle neutron scattering beam time for the PI for structural studies of plasma protein von Willebrand factor under static and shear conditions.

Role: PI

19. *Agency:* NIST Center for Neutron Research

Title: "Shear-induced conformational changes and aggregation of von Willebrand factor"

Period: 2002

Amount awarded: This award provides 2-days neutron beamtime for small angle scattering studies.

Role: PI. P. Alexandridis and H. Shankaran are co-PIs.

20. *Agency:* UB IRCAF award

Title: "Kinetics and affinity of vWF self-association, binding to P-selectin and collagen measured using surface plasmon resonance"

Period: 2004

Amount awarded: \$25,000 (total and direct cost).

Role: SN is PI with co-PIs P. Alexandridis and H. Suga (50% spent in SN's laboratory)

21. *Agency:* American Heart Association

Title: "Mechanism of L-selectin-ligand binding"

Period: 7/01-6/03

Amount awarded: \$30,000 (total direct cost, no indirect costs allowed).

Role: Pre-doctoral Fellowship awarded to support M. Beauharnois, a graduate student in SN's laboratory.

22. *Agency:* Whitaker Biomedical Engineering Foundation *Title:* "Selectin-ligand binding under hydrodynamic shear" *Period:* 10/00-09/03.

Amount awarded: \$221,999 (total cost) and \$ 177,600 (direct cost)

Role: SN is sole-PI

23. *Agency:* Health Research Inc.- Roswell Park Cancer Institute/ N.I.H.

Title: "Studies of glycosyltransferases"

Period: 10/01-12/02

Amount awarded: \$ 22,000 (total direct cost).

Role: SN is sole PI. This award is a sub-contract from Roswell Park for work related to a collaborator's NIH grant.

24. *Agency:* Education technology grant, University at Buffalo

Title: "Graphical Programming and data acquisition for CE labs"

Period: 6/01-5/02

Amount awarded: \$9,000 (direct and total cost)

Role: SN is sole PI, All funds were spent to upgrade department laboratory.

25. *Agency:* United Engineering Foundation

Title: "A multi-parameteric analysis of the factors affecting leukocyte-platelet thrombus growth"

Period: 10/99-9/00

Amount awarded: \$25,000 (direct and total cost)

Role: SN is sole PI

26. *Agency:* Henry and Camille Dreyfus Foundation

Title: "Multifaceted project to assess cell growth and product formation kinetics"

Period: 05/99-12/99

Amount awarded: \$23,917 (direct and total cost)

Role: SN is sole PI

27. *Agency:* Technicor, Inc. and Strategic Partnership for Industrial Resurgence (SPIR)

Title: "Analysis of fluid recovery from Technicor transport products"

Period: 8/99-3/00

Amount awarded: \$55,005 (Total cost)

Role: Neelamegham is Co-program director with T. Mattulke and P. Alexandridis (40% of funds expended in Neelamegham laboratory)

28. *Agency:* UB Pilot project grant

Title: "Rational synthesis of high affinity selectin-ligand analogues using studies of combinatorial chemistry and cellular adhesion mechanics"

Period: 7/00-06/01

Amount awarded: \$20,000 (total and direct cost).

Role: SN is PI on this grant with co-PI K. L. Matta from RPCI

Supervision of research

Current members:

Staff Research Scientist:

1. Dr. Anju Kelkar (2013 - present)
Develop novel biomolecular methods: CRISPR-Cas9 and Next Generation Sequencing technology

Ph.D. students:

2. Kai Cheng (Ph.D. candidate, 2013-present)
"Open source glycoproteomic tools development for analysis of complex biological samples"
Honors: Silver Medal, HUPO Glycoproteomics challenge
3. Theodore Groth (Ph.D. candidate , 2017-present)
"Mapping glycosylation pathways using massive data sets"
Honors: U.B. Presidential Fellowship
4. Gabrielle Pawlowski (Ph.D. candidate, 2017-present)
"De novo algorithms for Glycome and Glycoproteome profiling"
Honors: Arthur A. Schomburg Fellowship
5. Qi Yang (Ph.D. student, 2019-present)
"Glycans and SARS-CoV-2"
6. Thomas A. Hughes (Ph.D. student 2019-present)
"Synthetic Biology and Glycan Systems Biology"
Honors: Amol Ajinkya Fellowship
7. Ryoma Hombu (Ph.D. student, 2020-present)
"Protein engineering of glycosyltransferases"

MS students:

1. Yoana Hammer (collaboration with Thermo Fisher, 2020-present)

2. Jiaheng Sun (targeted exosome delivery *in vivo*, 2021-present)
3. Arun Singh (2021-present)

Previous members

1 Research faculty, 8 Post-doctoral fellows; 20 Ph.D. students; 10 M.S. students.

Research faculty (last known position):

Gang Liu (2012-2015, Data Scientist, Repertoire Immune Medicines)
Research Topic: Systems Glycobiology computational frameworks

Post-doctoral Fellow (last known position):

Dr. Virginia del Solar (2016-2019, Scientist, Cell & Gene Therapy Catapult, London, UK)
Research Topic: Glycan chemistry and mass spectrometry: Glycomics and Glycoproteomics

Gino Stolfa (2012 – 2016, Staff Scientist, Molecular Biology, ThermoFisher, Grand Island, NY)
Research Topic: CRISPRs (Clustered Regularly Interspaced Short Palindromic Repeats) and protein engineering for studies of glycosylation

Chi Lo (2013-2015, Manufacturing Specialist, DiscGenics, Salt Lake City, UT)
Research Topic: Engineering stem cell adhesion properties for the ischemic heart
Research Honors: NIH T32 training awardee

S. S. Lakhman (2001- 2003, Associate Professor, Larkin University, FL)
Research Topic: “Structure function relationships guiding selectin-ligand binding rates”

K. M. Dayananda (2006-2011, Research Scientist, Dr. Reddy’s laboratory, Hyderabad, India)
Research Topic: “Von Willebrand Factor self-association under shear”

D. Jayakumar (2006-2009, Scientist, Albert Einstein College of Medicine, New York) Research Topic: “Flow cytometry assays to detect site-specific glycosylation”

E. Themistou (2006-2009, Lecturer, Queen’s University, Belfast, School of Chemistry and Chemical Engineering)
Research Topic: “Protein structure changes under shear monitored using fluorescence spectroscopy”

Chengwei Shang (2006- 2009, Director of Process Research, Buchang New Drug R&D Co., Beijing, China) Research Topic: “Application of proteomics to study VWF structure”

PhD students (Previous students with last known position):

Harish Shankaran (Ph.D., 1997-2003, Principal Scientist, Biologics Discovery at Merck Pharmaceuticals)
Thesis Title: “Cellular aggregation, platelet activation and von Willebrand Factor self-association under hydrodynamic flow”

Research Honors: Awardee, Graduate Student Research Symposium. 2000

Yi Zhang (Ph.D., 1998- 2005, Post-doctoral Fellow, University of Tennessee Health Science Center, Memphis, TN)

Dissertation Title: “Estimating Adhesion Efficiency in flow chambers: Kinetics of β_2 -integrin activation in blood polymorphonuclear neutrophil”

Zhihua Xiao (Ph.D., 2000- 2007, President, Shanghai OPM Biosciences Co. Ltd) Dissertation Title: “Platelet-Neutrophil Adhesion and Neutrophil Activation Induced by Platelet Activation”

Dhananjay Marathe (Ph.D., 2001-2008, Principal Scientist, Clinical Pharmacologist, Merck Pharmaceuticals)

Dissertation Topic: “Glycosylation in cell adhesion molecules”

Research Honors: Awardee, Graduate Student Research Symposium. 2007

Gang Liu (Ph.D., 2001-2008, Computational Biologist/Data Scientist, Repertoire Immune Medicines, North Carolina) Dissertation Topic: “Application of systems biology to study inflammatory diseases ”

Indrajeet Singh (Ph.D., 2003-2009, Director, Clinical Pharmacology, Gilead Sciences, San Francisco, CA)

Dissertation Topic: “von Willebrand factor structure and function”

Mark Beauharnois (Ph.D., 1999 – 2012, Global Director, Unifrax LLC)

Dissertation Title: “Affinity and kinetics of selectin mediated leukocyte adhesion”

Research Honors: American Heart Predoctoral fellowship 2010-2012

Department of Education Graduate Student fellowship, 1999-2002

Shilpa Patil (Ph.D., 2006-2012, Process Engineer, Intel Corporation)

Dissertation Topic: “Glycan signature changes during stem cell differentiation and cancer”

Alex Buffone (Ph.D., 2006-2012, Assistant Professor, New Jersey Institute of Technology)

Dissertation Topic: “Terminal glycosyltransferases critical in mediating selectin-dependent adhesion in human leukocytes”

Chi Lo (Ph.D., 2007-2013, Manufacturing Specialist, DiscGenics) Dissertation Topic: “Detection of site specific glycosylation”

Research Honors: Presidential fellowship 2008-2012

NSF IGERT fellowship 2007-2008

American Heart Predoctoral fellowship 2010-2012

Mark Diamond Research Fund Scholarship (2010-2011)

Sri Madhabushi (Ph.D., 2007-2012, Scientist, Merck Pharmaceuticals)

Dissertation Topic: “Structural insight into the inter-domain regulation of von Willebrand Factor function in blood”

Research Honors: Graduate Student Award, Biomedical Engineering Society, 2010 American Heart Predoctoral fellowship 2010-2012

Awardee, Graduate Student Research Symposium, 2011 Honorable mention, UB Eng. Graduate Student Competition, 2012

Nandini Mondal (Ph.D., 2008-2014, Scientist, Beam Therapeutics)
Dissertation Topic: "Glycosyltransferases regulating human leukocyte adhesion to inflamed endothelial cells"

Shobhit Gogia (Ph.D., 2008-2014, Validation Lead, Gilead Sciences, San Francisco, CA)
Dissertation Topic: "Intracellular and extracellular regulation of VWF size: Role of calcium studied using novel FRET probes"

Rohitesh Gupta (Ph.D., 2010-2016, Research Scientist, Biologics division, Aurobindo Pharma)
Dissertation Topic: "Sialyltransferases: Dynamic regulators of cellular function"

Shuen Shiuan Wang (Ph.D., 2011-2017, Regulatory & Clinical Analyst, Amarex Clinical Research, Germantown, MD)
Dissertation Topic: "Small molecule inhibitors of cell adhesion"

Changjie Zhang (Ph.D., 2012-2018, Cell process engineer, FloDesign Sonics/Millipore Sigma, Springfield, MA)
Dissertation Topic: "Fluid shear and von Willebrand Factor regulating protein self-association and thrombosis"

Yusen Zhou (Ph.D., 2013-2020, Programmer: UNC-Chapel Hill)
"Multilevel regulation of glycosylation: Network synthesis and analysis"

Yuqi Zhu (Ph.D., 2013-2020, Scientist: Wuxi Pharmaceutical, Philadelphia)
"Systems Glycobiology: Library based technologies for discovery of E-selectin ligands"

Xinheng Yu (Ph.D. 2015-2020, Senior Research Scientist, Halda Therapeutics, CT)
"Synthetic Glycan Biomarkers: Longitudinal metabolic analysis"

Arezoo Momeni (Ph.D. candidate, 2014-2021, Scientist, Evozyne, Inc.)
"Glycan engineering of stem cells for cardiac applications"
Honors: NY State Stem Cell program poster competition awardee, Rockefeller University, NY

Masters students (Previous students with last known position):

Lenh Mong (M.Eng. 1998, Research Personnel, Ortec International, New York)
Thesis Title: "An *in vitro* study of the kinetics of heterotypic neutrophil-platelet adhesion under hydrodynamic shear"

Fariyal Ahmed (M.S. 2000, Scientist, Baxter Pharmaceuticals)
Thesis Title: "The Physico-chemical properties of Poloxamers modulate inhibition of platelet aggregation"

Adam Adler (M.S., 2002, Engineer, ConEd)
Thesis Title: "Regulation of neutrophil function following cross-linking of the α ₂-integrin subunits, LFA-1 and Mac-1"

Camille Williams (M.S., 2003, W.R. Gore)

Thesis Title: "VWF multimers resolution using gel filtration"

Hanwen Yang (M.S. 2009-2011, GlaxoSmithKline Biopharmaceutical analytical group)
Dissertation Topic: "Multiple shRNA lentiviral vectors"

Apurv Puri (M.S. 2011-2013, Santofi GEnzyme)
Dissertation Title: "Mathematical Modeling of N glycosylation: Model Construction and Parameter Estimation from Mass Spectra of Chinese Hamster Ovary Cell Mutants"

Sogol Hekmatkar (M.S. 2013-2015, Bioprocess Engineer, AveXis, Inc.)
Dissertation Title: "Role of FUT7 during leukocyte adhesion and extravasation"

Jacob De Bell (M.A. 2016-2017)
Project Title: Making anti-selectin monoclonal antibodies for large animal studies

Ashirtha Mandava (M.S. 2018-2020)
"Von Willebrand Factor pharmacokinetics and pharmacodynamics"

Purna Pant (M.S., 2019-2021, Scientist: Roswell Park Cancer Institute)
Project title: Discovery of E-selectin ligand

Undergraduate Students

- Fariyal Ahmed (B.S. in Chemical Engineering), Spring 1998
- David Geer (B.S. in Chemical Engineering), Spring 1998
- Trevor Mckee (B.S. in Chemical Engineering), Fall 1998
- Sotirios Diamantis (B.S. in Chemical Engineering), Fall 1998
- Helena Holeckova (B.S. in Chemical Engineering), Fall 1999
- Joeseoph Moritz (B.S. in Chemical Engineering), Fall 1999, Spring 2000, Summer 2000. Kim Helmer (B.S. in Chemical Engineering), Fall 2000
- Joe Kuechle (B.S. in Chemical Engineering), Summer 2001
- Temitope Ajao (B.S. in Chemical Engineering), Spring 2003
- Meghan Mclowski (B.S. in Chemical Engineering, University of Rochester), Summer 2005
- Matthew Battaglia (B.S. in Biomedical Engineering, Case Western Reserve University), Summer 2006
- Sabina Khanna (B.S. in Biomedical Engineering, University of Pennsylvania), Summer 2007
- Vera Neroni (B.S. Pharmacology Major, Unvisersity at Buffalo), 2008
- Pei Shan Tei (B.S. Chemical Engineering, University at Buffalo), 2009
- Kyle McHugh (B.S. Chemical Engineering, University at Buffalo) Summer 2009-Spring 2010
- Ivie Aiufwa (B.S. Chemical Engineering, University at Buffalo) Fall 2010
- Hannah Wang (B.S. Chemical Engineering, University at Buffalo) Fall 2010
- Benjamin Morgz (B.S. Chemical Engineering, University at Buffalo) Summer 2011
- Aaron Lau (High school senior) 2011-2012
- Ryan Zeiger (B.S. Chemical Engineering, University at Buffalo), 2013
- Patrick Krohl (B.S. Chemical Engineering, University at Buffalo), 2016-2017

- Joseph Balthasar, Jr. (B.S. Mechanical Engineering, University at Buffalo), 2017
- Julia Caserto (B.S. Chemical Engineering, University at Buffalo), 2018-2019
- Bhargavi Gindra (B.S. Biomedical Engineering, University at Buffalo), 2022-

MS Dissertation Committee membership (only partial list is available since they are too many)

Randall Smith (M.S., Chemical and Biological Engineering, University at Buffalo, 2011-2013)

Iven Yarovey (M.S., Chemical and Biological Engineering, University at Buffalo)

Jingyuan Gao (M.S., Chemical and Biological Engineering, University at Buffalo)

Other PhD Dissertation Committee memberships

- Shinghua Ding (Ph.D., Physiology and Biophysics, University at Buffalo)
- Bharat Bajaj (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- David Geer (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Pedro Lei (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Zhiyong Gu (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Wei Guo (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Tsuo-Feng Wang (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Piyush Koria (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Zack Fowler (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Jun Tian (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- MengHorng Lee (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Yajun Yan (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Joe Chemler (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Hao Fan Peng (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Juhee Han (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Lye Theng Lock (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Donghui Jing (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Cheng Huo (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Ryan Lim (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Pradeep Nagaraja (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Eric Peng (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Hila Dvora (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Roshan Padmashali (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Stella Alimperti (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Maoshih Liang (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Jasdeep Mann (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Jingcheng Wu (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Abhirath Parikh (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Yun Yu (Ph.D., Chemical and Biological Engineering, University at Buffalo, 2009-13)

- Mahmoud K. Ahmadi (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Charles Jones (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Yi Li (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Christopher Dougher (Ph.D., Immunology, Roswell Park Cancer Institute)
- Preeti Ashok (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Randall Smith (Ph.D., Biomedical Engineering, University at Buffalo)
- Suyog Pol (Ph.D., Biomedical Engineering, University at Buffalo)
- Upendra Chitgupti (Ph.D., Biomedical Engineering, University at Buffalo)
- Panagiotis Mistiotis (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Vivek Bajpai (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Sheida Jamalzadeh (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Andrew Kroetsch (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Nicholas Moscatello (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Georgios Tseropoulos (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Frank Leon ((Ph.D., Biochemistry Molecular Biology, University of Nebraska Medical College, UNMC)
- Mitchell Maloy (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Charles Manhardt (Molecular and Cellular Biology, Roswell Park Cancer Institute, Buffalo, NY)
- Aref Shahini (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Laura Parisi (Ph.D., Chemistry, University at Buffalo)
- Dongwon Park (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Bita Nasiri (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Nika Rajabian (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Marie Beitelshes (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Nicholas Moscatello (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Ronel Zachariah Samuel (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Shriramprasad Venkatesan (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Kailei Liu (Ph.D., Chemical and Biological Engineering, University at Buffalo)
- Jordan Johnson (Ph.D., Biomedical Engineering, University at Buffalo)

Selected invited seminars and presentations

1. S. Neelamegham, "Genetic and small molecule strategies to edit the glycocalyx" in *Structure/Function and Manipulation and Imaging of the glycocalyx* at ASBMB Experimental Biology 2022 meeting, Philadelphia, PA.
2. S. Neelamegham, "Glycoproteomics strategies to assay the glycome", in *Glycosylated proteins and their role in health and disease* at ACS Spring, San Diego, 2022.
3. S. Neelamegham, "Systems approaches to edit the glycome using small molecules and genetic approaches", NHLBI Systems Biology meeting, 2021.
4. S. Neelamegham, "Systems Glycobiology: New technologies to quantify the glycome and

- applications to SARS-CoV-2 ailments”, Department of Chemical Engineering & Bioengineering, University of Pennsylvania, virtual seminar, Fall 2021.
5. S. Neelamegham, “SynGlycan reagents for longitudinal, non-destructive measurement of the glycome”, 8th Warrant Workshop and Beilstein Symposium, Grenoble, France, June, 2021.
 6. S. Neelamegham, Wertheim Lectureship at Florida International University, Summer 2021.
 7. S. Neelamegham, “Systems glycobiology: Glycan biosynthesis as a possible host-targeted therapy for COVID-19”, NHLBI, Zoom lecture, September, 2019.
 8. S. Neelamegham, “Systems glycobiology for the study of human diseases”. Glycobiology Research & Training Center, University of California, San Diego, CA, 2019
 9. S. Neelamegham, “Molecular engineering for vascular disorders”, Department of Biomedical Engineering, Vanderbilt University, Nashville, TN, 2019.
 10. S. Neelamegham, “Cancer Systems Glycobiology”, Palleon Pharmaceuticals, Boston, MA, 2019.
 11. S. Neelamegham, “Studies on Human von Willebrand Factor and Glycosylation”, Blood Center of Wisconsin, Milwaukee, WI, 2019.
 12. S. Neelamegham, “Enabling tools for systems level analysis of glycosylation”, The Society of Glycobiology Annual Meeting Satellite, New Orleans, 2018.
 13. S. Neelamegham and P. Stanley. “The SNFG Code and the NCBI Glycan Page”, CFG Sponsored Satellite Meeting, The Society of Glycobiology Annual Meeting, New Orleans, 2018.
 14. S. Neelamegham. “Systems Glycobiology: Complementing computational studies with novel molecular technologies”, NHLBI, Bethesda, MD, 2018.
 15. S. Neelamegham, “Chemical transport and reaction processes in biological systems”, American Chemical Society (ACS-WNY), Jacob Schoelkopf award lecture, Buffalo, NY, 2018.
 16. S. Neelamegham, “Analysis of high-throughput glycoproteomics mass spectrometry experiments” 29th International Carbohydrate Symposium, Lisbon, Portugal, 2018.
 17. “Role of glycans in regulating leukocyte adhesion biomechanics and cellular signaling”, World Congress of Biomechanics, Dublin, Ireland, 2018.
 18. S. Neelamegham, “Systems Glycobiology: Wetlab tools and glycoinformatics resources to curate large scale experimental datasets”, Palleon Pharmaceuticals, 2018
 19. “Glycan structures regulating human inflammatory diseases”, Department of Biomedical Engineering, University of California- Davis, 2018.
 20. S. Neelamegham, “Systems level analysis of glycosylation—new tools to profile the metabolome”, Department of Biomedical Engineering, Rutgers University, NJ, 2018.
 21. S. Neelamegham, “Glycoinformatics tools to analyze and curate large scale experimental datasets”, International Life Science Integration Workshop, Tokyo, Japan, 2018.
 22. S. Neelamegham, “New developments at *VirtualGlycome.org*”, Society for Glycobiology-Glycoinformatics satellite, Portland, OR, 2017.
 23. S. Neelamegham, “Completing VWF: Interactions between complement pathways and the coagulation cascade”, Fueling Conversations in Complement Meeting (Complementology Conference), Buffalo, NY, 2017.
 24. S. Neelamegham, “Data handling and future trends: software strategies”, Water’s lecture at the Complex Carbohydrate Research Center, University of Georgia, Athens, GA, 2016.
 25. S. Neelamegham, “Systems level studies of cellular glycosylation: Applications in human inflammation biology and regenerative medicine”, Department of Chemical and Biomolecular Engineering, Rice University, Houston, TX, 2016
 26. S. Neelamegham, “Glycoscience: The art of making sugars of different kinds”, Genomics,

- Environment and Medicine Community of Excellence lecture, Buffalo, NY, 2016.
27. S. Neelamegham, "Towards a systems-view of glycosylation: Mathematical modeling and wet-lab experiments", National Heart Lung and Blood Institute, Bethesda, MD, 2016.
 28. S. Neelamegham, "It's a sticky world: Mucins and glycoproteins regulating leukocyte-endothelial cell adhesion", Department of Biochemistry and Molecular Biology, University of Nebraska Medical Center, 2015.
 29. S. Neelamegham, "A systems glycobiology approach to study leukocyte-endothelial cell interactions", The Society for Glycobiology and Japanese Society of Carbohydrate Research Meeting, Honolulu, Hawaii, 2014.
 30. S. Neelamegham, "Role of hydrodynamic shear mediated platelet deformation on cell tethering, translocation and activation", World Congress of Biomechanics, Boston, MA, 2014.
 31. S. Neelamegham, "Glycosyltransferases regulating human leukocyte adhesion to selectins", 27th International Carbohydrate Symposium (ICS27), Bangalore, India, 2014.
 32. S. Neelamegham, "Systems Biology of Glycosylation", Emerging Trends in Glycosciences & Glycotechnology, New Delhi, India, 2014.
 33. S. Neelamegham, "The balance between bleeding and thrombosis: Role of von Willebrand Factor", Colorado School of Mines, 2013.
 34. S. Neelamegham, "Glycosyltransferases responsible for the synthesis of physiological human E-selectin ligands", Multiscale modeling meeting, Washington DC, 2013.
 35. S. Neelamegham, "Regulation of VWF structure and function by hydrodynamic shear", XXIV Congress of the International Society of Thrombosis and Haemostasis, Amsterdam, Netherlands, 2013.
 36. S. Neelamegham, N. Mondal, A. Buffone, "Glycosyltransferases regulating human leukocyte adhesion to selectins", 17th conference of the European Society of Clinical Hemorheology and Microcirculation, Pecs, Hungary, 2013
 37. S. Neelamegham, "Aspects of hydrodynamic shear regulating platelet adhesion to extracellular matrix components", Material Science and Technology, Pittsburgh, PA, 2012.
 38. S. Neelamegham, "Systems Glycobiology", UB School of Pharmacy, Buffalo, NY, 2012.
 39. S. Neelamegham, "Glycan engineering principles", National Institute of Immunology, New Delhi, India, 2011.
 40. S. Neelamegham, "Regulating leukocyte-endothelium interaction using RNA interference and metabolic inhibitors", Life Technology, Grand Island, NY, 2011.
 41. S. Neelamegham, "Systems Glycobiology: Analysis of glycosylation reaction networks", Society for Glycobiology, Annual Meeting, St. Petersburg, Florida, 2010.
 42. S. Neelamegham, "Systems levels analysis of glycosylation reaction networks", UB Dental School, Spring 2010.
 43. S. Neelamegham, "Glycobiotechnology", University of Texas, San Antonio, Fall 2009.
 44. S. Neelamegham, "Conformation change in human blood protein von Willebrand Factor induced by fluid shear", ISTH, 2009.
 45. S. Neelamegham, "Altering leukocyte-endothelial adhesion rates", National Institute of Immunology, New Delhi, India, Fall 2009.
 46. S. Neelamegham, "Glycan Engineering: Metabolic strategies to regulate leukocyte adhesion during inflammation", Oral Biology Department, University at Buffalo, Buffalo, NY, 2009
 47. S. Neelamegham, "On the role of von willebrand factor and fluid shear in regulating blood platelet function", UB Pharmaceutical Sciences Department, 2008.

48. S. Neelamegham, "Systems level modeling and experimentation: Leukocytes adhesion during inflammation", Univ. of Texas Health Science Center at San Antonio, September 7, 2007
49. S. Neelamegham, "Our studies with von Willebrand Factor: Solution structure and function", Western New York Hemophilia Center, March, 2007
50. S. Neelamegham, "Light and neutron scattering spectroscopy applied in studies of vascular biology", Chemical Engineering Department, Johns Hopkins University, November, 2006
51. S. Neelamegham, "Advanced spectroscopy methods applied to studies of vascular biology", UB Medical School MSTP lecture, April, 2006
52. S. Neelamegham, "Adhesion Molecules in Vascular Diseases", UB Medical School, September, 2005.
53. S. Neelamegham, "Selectin and Integrin mediated leukocyte adhesion under fluid flow", Molecular and Cell Biology seminar, Roswell Park, January, 2006.
54. S. Neelamegham, "Engineering principles applied to studies in vascular biology", International E-symposium on "Pharmaceutical Engineering", Tiruchirapalli, India, March 2006.
55. S. Neelamegham, "Cell adhesion during Inflammation and Thrombosis", Indian Institute of Science, Bangalore, India, 2004.
56. S. Neelamegham, "Platelet and leukocyte adhesion during innate immunity", National Institute of Immunology, Delhi, India, 2004.
57. Neelamegham, S. "The nature of fluid forces regulating vascular pathologies ", Biomedical Engineering, Penn. State University, State College, PA, 2003.
58. Neelamegham, S. "Inflammation and Thrombosis ", Chemical Engineering, Cleveland State University, Cleveland, OH, 2003.
59. Neelamegham, S. and Shankaran, H., "The nature of mechanical forces regulating shear-induced platelet activation", World Congress of Biomechanics, Calgary, Canada (2002).
60. Neelamegham, S. "Modulation of leukocyte, platelet and von Willebrand Factor function by fluid shear", Department of Pediatrics, Baylor College of Medicine, Houston, TX, 2002.
61. Neelamegham, S. "The nature of fluid forces regulating vascular pathologies ", Diabetes-Endocrinology Center of Western New York, Millard Fillmore Hospital, Buffalo, NY, 2002.
62. Neelamegham, S. "Neutrophil and Platelet adhesion mechanics", Tuberculosis Research Center, Indian Council of Medical Research, Chennai, India 2002.
63. Neelamegham, S. "Role of shear flow in regulating inflammatory processes", Biomedical Engineering, University of Rochester, NY 2001.
64. Neelamegham, S. "Neutrophil Adhesion mechanics under hydrodynamic shear", Molecular and Cellular Biophysics, Roswell Park Cancer Institute, Buffalo, NY 2001.
65. Neelamegham, S. "Neutrophil Adhesion mechanics under shear", Pharmaceutics Department, University at Buffalo, Buffalo, NY 1999.
66. Neelamegham, S., "Biomechanics of neutrophil adhesion", Chemical Engineering, Purdue University, West Lafayette, IN 1997.
67. Neelamegham, S., "Biophysical considerations regulating neutrophil homotypic aggregation", Chemical Engineering, State University of New York, Buffalo, NY 1997.
68. Neelamegham, S., "Selectin and Integrin mediated cellular interactions", Chemical Engineering, University of Michigan, Ann Arbor, MI 1997.
69. Neelamegham, S., " β_1 -integrin mediated lymphocyte motility and attachment: Application of digital image processing and mathematical modeling", NASA Johnson Space Center, Houston, TX 1995.

Classroom lectures

CE517 Bioengineering Principles

Description: 3 credit lecture based course that introduces bioengineering research and experimentation principles to incoming graduate students

Years instructed: 2011-present (Spring or Fall semesters)

CE446/547 Biochemical Engineering

Description: 3 credit lecture based course that introduces bioprocess engineering principles to junior/senior level undergraduates and freshman graduate students

Years instructed: 1997-present (Fall or Spring semesters)

CE447 Biotransport and kinetics

Description: 3 credit lecture based course on the applications of transport phenomenon and chemical kinetics to the field of bioengineering

Years instructed: 2009-2010

CE405/505 Cellular and Molecular Bioengineering

Description: 3 credit lecture based course introducing principles of cellular and molecular bioengineering

Years instructed: 2003

PHC 539 Protein and antibody therapeutics

Description: Offer lectures in Pharmaceutical Sciences department on glycosylation and its impact on protein therapeutics

Years instructed: 2015-

RPG533 Biophysical and Biochemical Techniques in Oncology

Description: Offer lectures on introduction to glycobiology at Roswell Park Comprehensive Cancer Institute.

Years instructed: 2018-present

BMS505 Cell Biology-II (University at Buffalo Medical School Course)

Description: 2 credit lecture-journal-research based course primarily directed towards medical school Ph.D. level students

Years instructed: 2006-2009 (Spring semesters)

CE318 Transport Process II

Description: 3 credit lecture based course on chemical engineering heat and mass transfer

Years instructed: 1998-2001

CE427 Chemical Engineering Lab III

Description: 1 credit undergraduate laboratory on heat, mass transfer and chemical engineering unit operations. Setup computer acquisition systems for laboratories and trained staff on usage and

programming.

Years instructed: 2001-2002

CE428 Chemical Engineering Lab IV

Description : 1 credit undergraduate laboratory on heat, mass transfer and chemical engineering unit operations. Wrote and acquired education grants to setup computer based data acquisition setups for various instruments.

Years instructed: 2001-2002