

## Sadagopan Krishnan (Gopan), Ph.D.

Associate Professor  
Department of Chemistry  
College of Arts and Sciences  
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### Education:

2010-2012: Postdoctoral Research, Chemistry, Oxford University, England

2010: Ph.D. Bioanalytical Chemistry, University of Connecticut, Storrs, USA.

2000: M.S., Chemistry, M. K. University, INDIA I-class

1998: B.S., Chemistry, M. S. University, INDIA I-class

### Appointments:

2012 Assistant Professor, Chemistry, Oklahoma State University, OK.

2010-2012 Postdoctoral research associate, Chemistry, Oxford University, England

2006-2010 Research Assistant, Chemistry, University of Connecticut, CT

2005-2006 Teaching Assistant, Chemistry, University of Connecticut, CT

2002-2005 Scientific Officer, Tata Institute of Fundamental Research, India.

2001-2002 Research Fellow, Defense Research & Development Organization, India

2000-2001 Chemist, Asian Paints (India) Ltd., India

### Honors and Awards:

2013: Got selected (national-level) to attend the Cottrell Scholars Collaborative (CSC) New Faculty Workshop, D.C.

2011: Nominated - Bioanalysis Young Investigator Award 2011, <http://www.ncbi.nlm.nih.gov/pubmed/21545342>

2010-2012: EPSRC funded Post-doctoral Fellowship, Oxford University

2006-2010: Research Assistantship (NIEHS,NIH), University of Connecticut

2005-2006: Teaching Assistantship, University of Connecticut

2010: Travel Award for attending the 37th ACS-Northeast Regional Meeting at Potsdam, NY

2009: Travel Award from the Physical & Analytical Electrochemistry Division of ECS, USA for attending the 215th ECS meeting at San Francisco, CA

2008: Travel Award from the Society of Electroanalytical Chemistry, USA for attending the Pittcon 2008 at New Orleans

2008: Graduate school fellowship to Organize the symposium entitled "Transitioning into Green Chemistry" at the 236th ACS National meeting, PA

2007: Travel Award from the Physical & Analytical Electrochemistry Division of ECS, USA for attending the 211th ECS meeting at Chicago

## Research Support:

- June 2014-May 2017: Mass Sensor Coupled with an Optical Array Imager for Diagnosing Type of Diabetes in Serum/Blood, NIH Academic Research Enhancement Award (AREA) Grants - (R15), Awarded: \$431,648, Role: PI
- Nov 2013-Nov 2014: OSU-Technology Business Development Program (TBDP II), Clinical Diabetes Sensor, Technology Development Center, Awarded: \$29,569, Role: PI
- Sep 2012-Sep 2015: Start-up funds by OSU, Awarded: \$400,000, Role: PI

## Selected Publications:

1. G. Premaratne, A. C. Dharmaratne, Z. H. Al Mubarak, F. Mohammadparast, M. Andiappan, and S. Krishnan, Multiplexed Surface Plasmon Imaging of Serum Biomolecules: Fe<sub>3</sub>O<sub>4</sub>@Au Core/shell Nanoparticles with Plasmonic Simulation Insights, *Sensors and Actuators B: Chemical*, 2019.
2. A. Walker, C. Walgama, R. Nerimetla, S. H. Alavi, E. Echeverria, S. P. Harimkar, D. N. McIlroy, and S. Krishnan, Roughened Graphite Biointerfaced with Human Liver Microsomes: Surface and Electrochemical Characterizations, *Submitted*.
3. C. Walgama, A. Pathirana, M. Akinwale, R. Montealegre, J. Niroula, E. Echeverria, D. N. McIlroy, T. A. Harriman, D. A. Lucca, and S. Krishnan, Buckypaper-Bilirubin Oxidase Biointerface for Electrocatalytic Applications: Buckypaper Thickness, *ACS Applied Bio Materials*, 2019, 2, 5, 2229-2236. [PDF]
4. G. Premaratne,† J. Niroula,† M. K. Patel, W. Zhong, S. L. Suib, A. K. Kalkan, and S. Krishnan, Electrochemical and Surface Plasmon Correlation of Serum Autoantibody Immunoassay with Binding Insights: Graphenyl Surface vs. Mercapto-Monolayer Surface, *Analytical Chemistry*, **2018**, 90, 12456–12463. († These authors contributed equally) [PDF]
5. S. Krishnan, M. Frazis, G. Premaratne, J. Niroula, E. Echeverria, and D. N. McIlroy, Pyrenyl–Carbon Nanostructures for Scalable Enzyme Electrocatalysis and Biological Fuel Cells, *Analyst*, 2018, 143, 2876-2882. [PDF]
6. R. Nerimetla, G. Premaratne, H. Liu, and S. Krishnan, Improved Electrocatalytic Metabolite Production and Drug Biosensing by Human Liver Microsomes Immobilized on Amine-Functionalized Magnetic Nanoparticles, *Electrochimica Acta*, 2018, 280, 101-107. [PDF]
7. V. Singh and S. Krishnan, Electrochemical and Surface Plasmon Insulin Assays on Clinical Samples, *Analyst (Critical Review)*, 2018, 143, 1544–1555. [PDF]
8. R. Nerimetla, C. Walgama, V. Singh, S. Hartson, and S. Krishnan, Mechanistic Insights into Voltage-Driven Biocatalysis of a Cytochrome P450 Bactosomal Film on a Self-assembled Monolayer, *ACS Catalysis*, 2017, 7, 3446–3453. [PDF]
9. G. Premaratne, S. Farias, and S. Krishnan, Pyrenyl Carbon Nanostructures for Ultrasensitive Measurements of Formaldehyde in Urine, *Analytica Chimica Acta*, 2017, 970, 23–29. [PDF]
10. G. Premaratne, Z. Al Mubarak, L. Senavirathna, L. Liu, and S. Krishnan, Measuring Ultra-low Levels of Nucleotide Biomarkers Using Quartz Crystal Microbalance and SPR Microarray Imaging Methods: A Comparative Analysis, *Sensors and Actuators: B Chemical*, 2017, 253, 368–375. [PDF]
11. V. Singh, R. Nerimetla, M. Yang, and S. Krishnan, Magnetite-Quantum Dot Immunoarray for Plasmon-coupled-Fluorescence Imaging of Blood Insulin and Glycated Hemoglobin, *ACS Sensors*, 2017, 2, 909–915. [PDF]
12. R. Nerimetla, S. Krishnan, S. Mazumder, S. Mohanty, G. G. Mafi, D. L. VanOverbeke, R. Ramanathan, Species-specificity in myoglobin oxygenation and reduction potential properties, *Meat and Muscle Biology*, 2017, 1, 1-7. [PDF]
13. (Invited) G. Premaratne, L. Coats, and S. Krishnan, NanoArmoring of Enzymes by Polymer-Functionalized Iron Oxide Nanoparticles. In C. Vijay Kumar, editor: *NanoArmoring of Enzymes: Rational Design of Polymer-Wrapped Enzymes*, Vol 590, MIE, UK: Academic Press, 2017, pp. 225-257.
14. J. Niroula, G. Premaratne, S. A. Shojaee, D. A. Lucca, and S. Krishnan, Combined Covalent and Noncovalent Carboxylation of Carbon Nanotubes for Sensitivity Enhancement of Clinical Immunosensors, *Chem. Commun.* **2016**, 52,13039-13042. [PDF]
15. V. Singh, C. Rodenbaugh, and S. Krishnan, Magnetic Optical Microarray Imager for Diagnosing Type of Diabetes in Clinical Blood Serum Samples, *ACS Sensors* **2016**, 1, 437-443. [PDF]
16. N. Lalaoui, N. Means, A. Le Goff, M. Holzinger, C. Walgama, S. Krishnan, and S. Cosnier, Enzymatic versus electrocatalytic oxidation of NADH at carbon-nanotube electrodes modified with glucose dehydrogenases. Application to bucky-paper-based glucose enzymatic fuel cells, *ChemElectroChem* **2016**, 3, 2058-2062. [PDF]
17. G. Premaratne, R. Nerimetla, R. Matlock, L. Sunday, R. S. Hikkaduwa Koralege, J. D. Ramsey, and S. Krishnan, Stability, Scalability, and Reusability of a Volume Efficient Biocatalytic System Constructed on Magnetic Nanoparticles, *Catal. Sci. Technol.* **2016**, 6, 2361–2369. [PDF]

18. (Invited) C. Walgama, M. Gallman, and S. Krishnan, Single Drop Electroanalysis and Interfacial Interactions: Sensitivity versus Limit of Detection, *Electroanalysis* **2016**, *28*, 2791-2796. (Special Issue: Professor Petr Zuman's 90th Birthday Issue). [PDF]
19. C. Walgama, Z. H. Al Mubarak, B. Zhang, M. Akinwale, A. Pathiranage, J. Deng, K. D. Berlin, D. M. Benbrook, and S. Krishnan, Label-free Real-time Microarray Imaging of Cancer Protein-Protein Interactions and Their Inhibition by Small Molecules, *Anal. Chem.* **2016**, *88*, 3130–3135. [PDF]
20. S. Varghese, C. Walgama, M. Wilkins, S. Krishnan, and K. Kalkan, Surface-Charge-Enabled Photolytic Hydrogen Generation in V2O5·H2O/Au Nanoconjugates, *MRS Advances*, Available on CJO 2016, *1*, Issue 46 (Energy and Environment), 3121-3126.
21. L. C. Kasi Viswanath, J. Bernhardt, K. Gnanasekaran, C. Want, J. Frank, J. Faulkner, and S. Krishnan, Alkyl- and aryl-substituted Benzo[ghi]perylene triimides: Synthesis, characterization and comparison of electrochemical and spectroscopic properties, *Dyes and Pigments* 2016, *134*, 453-458. [PDF]
22. (Invited Book Chapter) S. Krishnan, and J. F. Rusling, Electrochemically Activated Catalytic Pathways of Human Metabolic Cytochrome P450s in Ultrathin Films, In: J. H. Zagal and F. Bedioui (eds.), *Electrochemistry of N4 Macrocyclic Metal Complexes*, 2nd Ed., Springer International Publishing, Switzerland, 2016, pp. 83-105, DOI: [10.1007/978-3-319-31332-0\\_2](https://doi.org/10.1007/978-3-319-31332-0_2)
23. Z. H. Al Mubarak, R. Ramesh, L. Liu, and S. Krishnan, Surface Plasmon Resonance Imaging of Gold-Small Molecule Interactions Is Influenced by Refractive Index and Chemical Structures, *J. Colloid Interface Sci.* **2015**, *460*, 209–213. [PDF]
24. R. Nerimetla, and S. Krishnan, Electrocatalysis by Subcellular Liver Fractions Bound to Carbon Nanostructures for Stereoselective Green Drug Metabolite Synthesis, *Chem. Commun.* **2015**, *51*, 11681-11684. [PDF]
25. C. Walgama, R. Nerimetla, N. F. Materer, D. Schildkraut, J. F. Elman and S. Krishnan, A Simple Construction of Electrochemical Liver Microsomal Bioreactor for Rapid Drug Metabolism and Inhibition Assays, *Anal. Chem.* 2015, *87*, 4712-4718. [PDF]
26. V. Singh, and S. Krishnan, Voltammetric Immunosensor Assembled on Carbon-Pyrenyl Nanostructures for Clinical Diagnosis of Type of Diabetes, *Anal. Chem.* **2015**, *87*, 2648-2654. [PDF]
27. C. Walgama, N. Means, N. F. Materer, and S. Krishnan, Edge-to-edge Interaction between Carbon Nanotube-Pyrene Complexes and Electrodes for Biosensing and Electrocatalytic Applications, *Phys. Chem. Chem. Phys.* 2015, *17*, 4025-4028. [PDF]
28. K. S. Prasad, C. Walgama, and S. Krishnan, Enhanced Electroactivity and Substrate Affinity of Microperoxidase-11 Attached to Pyrene-linkers n-n Stacked on Carbon Nanostructure Electrodes, *RSC Adv.* **2015**, *5*, 11845-11849. [PDF]
29. A. Singh, K. Teegardin, M. Kelly, K. S. Prasad, S. Krishnan, and J. D. Weaver, Facile Synthesis and Complete Characterization of Homoleptic and Heteroleptic Cyclometalated Iridium(III) Complexes for Photocatalysis, *J. Organomet. Chem.* 2015, *776*, 51-59. [PDF]
30. L. C. Kasi Viswanath, L. D. Shirtcliff, S. Krishnan, and K. D. Berlin, SubPc-ZnPorphyrin Conjugates - Synthesis, characterization and properties, *Dyes Pigments* 2015, *112*, 283-289. [PDF]
31. M. K. Patel, M. A. Ali, S. Krishnan, V. V. Agrawal, A. A. A. Al Kheraif, H. Fouad, Z. A. Ansari, S. G. Ansari, and B. D. Malhotra, A Label-Free Photoluminescence Genosensor Using Nanostructured Magnesium Oxide for Cholera Detection, *Sci. Rep.* **2015**, *5*, 17384; doi: 10.1038/srep17384
32. R. Nerimetla, C. Walgama, R. Ramanathan, and S. Krishnan, Correlating the Electrochemical Kinetics of Myoglobin-films to pH Dependent Meat Color, *Electroanalysis* **2014**, *26*, 675-678. [PDF]
33. L. C. Kasi Viswanath, L. D. Shirtcliff, S. Krishnan, N. V. Handa, and K. D. Berlin, Synthesis, photophysical and electrochemical properties of bay-axial perylene diimide-subphthalocyanine dyads, *Tetrahedron Lett.* **2014**, *55*, 4199-4202. [PDF]
34. V. Singh, and S. Krishnan, Electrochemical Mass Sensor for Diagnosing Diabetes in Human Serum, *Analyst* 2014, *139*, 724 – 728. [PDF]
35. C. Walgama, and S. Krishnan, Tuning the electrocatalytic efficiency of heme-protein films by controlled immobilization on pyrene-functionalized nanostructure electrodes, *J. Electrochem. Soc.* 2014, *161*, H47-H52. [PDF]
36. S. Krishnan, and C. Walgama, Electrocatalytic Features of a Heme-Protein Attached to Polymer Functionalized Magnetic Nanoparticles, *Anal. Chem.* 2013, *85*, 11420–11426. [PDF]
37. (Invited Book Chapter) S. Krishnan\* and J. F. Rusling, Thin Iron Heme Enzyme Films on Electrodes and Nanoparticles for Biocatalysis, *Chapter 5*, In: *New and Future Developments in Catalysis*, Elsevier Publishers, 2013, pp.125-147.
38. S. Krishnan and F. A. Armstrong, Order-of-Magnitude Enhancement of an Enzymatic Hydrogen-Air Fuel Cell based On Pyrenyl Carbon Nanostructures, *Chem. Sci.* **2012**, *3*, 1015-1023.
39. Bioanalysis Young Investigator: Sadagopan Krishnan, *Bioanalysis*, 2011, *3* (9), 949-50.

40. S. Krishnan, V. Mani, D. Wasalathanthri, C. V. Kumar, and J. F. Rusling, Attomolar Detection of a Protein Biomarker in Serum by Surface Plasmon Resonance Using Superparamagnetic Particle Labels, *Angew. Chem. Int. Ed.* 2011, 50, 1175–1178.
41. S. Krishnan, D. Wasalathanthri, L. Zhao, J. B. Schenkman, and J. F. Rusling, Efficient Bioelectronic Actuation of The Natural Catalytic Pathway of Human Metabolic Cytochrome P450s, *J. Am. Chem. Soc.*, 2011, 113, 1459–1465.
42. S. Krishnan, J. B. Schenkman, and J. F. Rusling, Bioelectronic Delivery of Electrons to Cytochrome P450 Enzymes, *J. Phys. Chem. B* 2011, 115, 8371–8380 (Cover, feature article).
43. S. Krishnan, A. Abeykoon, J. B. Schenkman, and J. F. Rusling, Control of Electrochemical and Ferryl-oxo Formation Kinetics of Cyt P450s in Polyion Films by Iron Heme Spin State and Secondary Structure, *J. Am. Chem. Soc.* 2009, 131, 16215–16224.
44. S. Krishnan, B. Bajrami, V. Mani, S. Pan, and J. F. Rusling, Comparison of DNA- Reactive Metabolites from Nitrosamine and Styrene using Voltammetric DNA/Microsomes Sensors, *Electroanalysis* 2009, 21, 1005–1013.
45. S. Krishnan, E. G. Hvastkovs, B. Bajrami, J. B. Schenkman, and J. F. Rusling, Human Cyt P450 Mediated Metabolic Toxicity of 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) evaluated using Electrochemiluminescent Arrays, *Mol. Biosyst.* 2009, 5, 163–169.
46. L. Zhao, S. Krishnan, Y. Zhang, J. B. Schenkman, and J. F. Rusling, Differences in Metabolite-mediated Toxicity of Tamoxifen in Rodent vs. Human Using Electrochemiluminescent Arrays and DNA/microsome Nanoreactors, *Chem. Res. Toxicol.* 2009, 22, 341–347.
47. S. Krishnan, E. G. Hvastkovs, B. Bajrami, D. Choudhary, J. B. Schenkman, and J. F. Rusling, Synergistic Metabolic Toxicity Screening Using Microsome/DNA Electrochemiluminescent Arrays and Nanoreactors, *Anal. Chem.* 2008, 80, 5279–5285 (cover article).
48. B. Bajrami, S. Krishnan, and J. F. Rusling, Microsome biocolloids for rapid drug metabolism and inhibition assessment by LC-MS, *Drug Metab. Lett.* 2008, 2, 158–162.
49. J. D. Fair, A. L. Bartelson, B. Bajrami, C. M. Cardillo, M. L. Dean, S. Krishnan, N. Sardesai, and T. A. Miller, Graduate Student Symposium Planning Committee Experiences, *J. Chem. Ed.* 2008, 85, 1609.
50. S. Krishnan and J. F. Rusling, Evaluation of Liver Microsomes for Genotoxicity Sensors: Voltammetry of the Microsomes, *Electrochem. Soc. Interface* 2007, 16 (4), 59–60.
51. S. Krishnan and J. F. Rusling, Thin film voltammetry of metabolic enzymes in Rat liver microsomes, *Electrochem. Commun.* 2007, 9, 2359–2363.
52. S. Krishnan, E. G. Hvastkovs, B. Bajrami, I. Jansson, J. B. Schenkman, and J. F. Rusling, Genotoxicity screening For N-nitroso compounds by electrochemical and electrochemiluminescent detection of human enzyme-generated DNA damage, *chem commun.*, 2007, 1713–1715.
53. E. G. Hvastkovs, M. So, S. Krishnan, B. Bajrami, M. Tarun, I. Jansson, J. B. Schenkman, and J. F. Rusling, Electrochemiluminescent Arrays for Cytochrome P450-activated Genotoxicity Screening. DNA Damage from Benzo[a]pyrene Metabolites, *Anal. Chem.* 2007, 79, 1897–1906.
54. I. P. Bhowmick, S. Krishnan, and G. K. Jarori, Differential susceptibility of Plasmodium falciparum versus yeast and mammalian enolases to dissociation into active monomers, *FEBS Journal*, 2007, 274, 1932–1945.
55. (Book Chapter) H. Vekaria, K. Sadagopan, J. Adamec, G. K. Jarori and C. R. Prabha, Thiol stress induces catalaseA in Streptomyces coelicolor (in: Communicating Current Research and Educational Topics and Trends in Applied Microbiology, Microbiology Book series, Formatex, Spain, 2007).
56. K. Sadagopan, A. S. Rekha, D. Ratna, and A. B. Samui, Synthesis and Characterization of Azo-based Methacrylate polymers with methoxy and nitro end groups for non-linear Optical applications, *J. Appl. Polym. Sci.* 2007, 104 (6), 3497–3504.
57. K. Sadagopan, S. Sawant, S. K. Kulshreshtha, and G. K. Jarori, Physical and Chemical Characterization of Enolase Immobilized polydiacetylene Langmuir Blodgett Film, *Sensors and Actuators B*, 2006, 115, 526–533.
58. I. P. Bhowmick, K. Sadagopan, H. K. Vora, A. Sehgal, S. Sharma, and G. K. Jarori, Cloning, Over Expression, Purification and characterization of enolase from Plasmodium falciparum, *European Journal of Biochemistry* 2004, 271, 4845–4854.
59. K. Sadagopan, D. Ratna, and A. B. Samui, Synthesis and Characterization of Liquid-Crystalline Epoxy and its Blend With conventional epoxy, *J. Poly. Sci Part A: Poly. Chem.* 2003, 41, 3375–3383.

**Patents:**

S. Krishnan, C. Walgama, and R. Nerimetla, Microsomal Bioreactor for Synthesis of Drug Metabolites, United States Patent Application, Pub. No.: US 2018/0044657, Pub. Date: Feb. 15, **2018**.

