CURRICULUM VITAE

Namal Wanninayake

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CURRENT POSITION

University of Kentucky, Department of chemistry — Lexington, KY
Research Assistant — 2015-Presnt

EDUCATION

University of Kentucky — Lexington, KY
PhD, Chemistry (Expected) — 2020
Dissertation: "Understanding Electrochemical conversion of carbon dioxide into usable fuels and chemicals via metal-carbon nanocomposites."

University of Peradeniya — Sri Lanka
BS. Chemistry — 2013
Thesis: "Preparation of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) (PHBV) nanospheres for the sustained release of Folic Acid."

HONORS, AWARDS AND FELLOWSHIPS

Outstanding poster presentation — 2019
Materials Research Society, Materials Networking Day — Lexington, KY

Philip L. Walker Award — 2019
American Carbon Society, International Carbon Conference — Lexington, KY

235th ECS meeting Travel grant — 2019
Electrochemical Society, Energy Technology Division — Dallas, TX

Top Student Research presentation award — 2019
National Science Foundation, EPSCoR super collider event — Lexington, KY

Student Poster award (Energy Category) — 2018
North American Membrane Society meeting — Lexington, KY

Next Generation Electrochemistry (NGenE)- Summer Institute Scholarship — 2018
UIC Energy Initiative - University of Illinois at Chicago — Chicago, IL

Outstanding Poster Presentation — 2018
Society of Postdoctoral Scholars, Fourth Annual Postdoctoral Research Symposium — Lexington, KY

Experimental Program to Stimulate Competitive Research Fellowship — 2016
National Science Foundation, EPSCoR — Lexington, KY

Fast Start Award- Outstanding initial overall progress towards the PhD — 2015
Department of Chemistry, University of Kentucky — Lexington, KY

PROFESSIONAL EXPERIENCES

Graduate Research — 2014-present
Department of Chemistry, University of Kentucky, — Lexington, KY
Prof. Doo Young Kim's laboratory.

- **Nanostructured Materials:** Synthesized Nitrogen-doped ultrananocrystalline diamond-based carbon materials by microwave-assisted chemical vapor deposition.
- **Electrocatalysts:** Heteroatom-doped carbon catalysts were utilized and studied fundamental aspects of electrochemical carbon dioxide conversion to usable fuels and chemicals.
- **Electrochemical reactor Engineering:** Designed a customized electrochemical flow cell reactor equipped with gas diffusion electrodes for the electrochemical carbon dioxide conversion.
- **Band Gap Engineering:** Nitrogen and hydrogen doped mesoporous Titania films were developed by microwave-assisted chemical vapor deposition technique to enhance visible light absorption and photocatalytic activity by tuning the bandgap of Titania.
- **Photocatalysts:** Produced hydrogen gas from photoelectrochemical water splitting, using doped and sensitized mesoporous Titania films under UV and visible light illumination. Synthesized graphene quantum dots and sensitized mesoporous titania films for visible light photocatalysis.
- **X-ray Scattering:** Studied the formation and thermal transformation mechanism of polymer templated titania thin films and their crystallization by in-situ grazing incidence small-angle and wide-angle x-ray scattering (GISAXS and GIWAXS), respectively using synchrotron source at Argonne National Laboratory, Illinois.
- **Membrane Separations:** Graphene Quantum Dot Integrated Cellulose Membrane composites were developed for small molecule separations.
- **Photodynamic Therapy:** Carbon Quantum Dots were synthesized and modified to understand their effect on photodynamic therapy.

Teaching Assistant

- **Instrumental analysis laboratory** — Fall-2019
  Department of Chemistry, University of Kentucky — Lexington, KY
- **Analytical chemistry laboratory** — Fall-2015
  Department of Chemistry, University of Kentucky — Lexington, KY
- **Organic chemistry laboratory** — Fall-2014, Spring-2015
  Department of Chemistry, University of Kentucky — Lexington, KY
- **General chemistry/physical chemistry** — Spring-2014
  Department of Chemistry, The Open University of Sri Lanka. — Nawala, Colombo
- **General chemistry** — Spring-2013, Fall-2013
  Department of Chemistry, University of Peradeniya, Sri Lanka — Peradeniya, Kandy
- **Analytical chemistry laboratory** — Spring-2013, Fall-2013
  Post Graduate Institute of Science, University of Peradeniya, Sri Lanka. — Peradeniya, Kandy

LEADERSHIP EXPERIENCE

Vice President — 2018-2019
Electrochemical Society, Kentucky Student Chapter
Organized seminars and workshops to broaden electrochemistry knowledge.

High school student training — Fall-2019, Spring-2020
Designed a project and trained a high school student on catalyst synthesis and reactor engineering for the CO_2 electroreduction.

Mentor — Fall 2017
A mentor for Broadening Participation in Materials Undergraduate Student Event at the 2017 MRS Fall Meeting. Trained an undergraduate student by completing a certain number of mutually determined goals by the mentor and mentee.

Undergraduate training — Fall 2016

Defined a project and advised an undergraduate student on the use of Microwave-assisted chemical vapor deposition reactor for the synthesis of catalysts for electrochemical CO_2 conversion.

PROPOSAL ACTIVITIES

Team member of an Advanced Photon Source general user proposal for the use of X-ray scattering facility from synchrotron source at Argonne National Laboratory (Proposal no: GUP 46428). The proposal title: "*In-situ GISAXS and GIWAXS studies of Thickness, Aging and Plasma Doping on Processing of Titania Thin Films with Oriented 2D Hexagonal Close-Packed (HCP) Mesostructure*". Fall-2016

SKILLS

Technical (regular use)
Chemical Vapor Deposition(CVD), Scanning Electron Microscopy (SEM), X-Ray Diffraction (XRD), Nuclear Magnetic Resonance(NMR), UV-vis Spectroscopy, Fourier Transformed Infra-Red Spectroscopy (FTIR), X-Ray Photoelectron Spectroscopy (XPS), Impedance Spectroscopy, Thermogravimetric Analysis (TGA), Bulk electrolysis, Electrodeposition, Zeta Potential, Contact Angle goniometer, Reactive Ion Etcher(RIE), scanning electrochemical microscopy(SECM) and Gas Chromatography (GC).

Technical (casual use)
Transmission Electron Microscopy (TEM), Scanning Transmission Electron Microscopy (STEM), Grazing Incidence Small Angle X-ray Scattering (GISAXS), Grazing Incidence Wide Angle X-ray Scattering (GIWAXS), Focused Ion Beam (FIB).

Graphics Design
Highly skilled in 3Ds max modeling and photoshop to interpret any scientific concept into a graphic or an animation.

INDUSTRIAL INTERNSHIP

Developed a method to recycle and reuse the bitumen in the wastewater Fall-2011
Supervised by- Mr. Roshan T. Kotuwegedara Bituminous Products Division (LANKEM CEYLON PLC) Sri Lanka - (Partial fulfillment of the chemistry degree, University of Peradeniya, Sri Lanka).

PEER-REVIEWED PUBLICATIONS

Google scholar profile - https://scholar.google.com/citations?user=e1j2iA8AAAAJ&hl=en

Published

- **Wanninayake, N.**; Ai, Q.; Zhou, R.; Hoque, M.; Herrell, S.; Guzman, M.; Risko, C.; Kim, D. Understanding the effect of host structure of nitrogen doped ultrananocrystalline diamond electrode on electrochemical carbon dioxide reduction. *Carbon* **2020**, *157*, 408-419.

- Thomas, M.; **Wanninayake, N.**; De Alwis Goonatilleke, M.; Kim, D.; Guiton, B. Direct imaging of heteroatom dopants in catalytic carbon nano-onions. *Nanoscale* **2020**, *12*, 6144-6152. (Equal contribution)

- Beasley, C.; Kumaran Gnanamani, M.; Santillan-Jimenez, E.; Martinelli, M.; Shafer, W.; Hopps, S.; **Wanninayake, N.**; Kim, D. Effect of Metal Work Function on Hydrogen Production from Photocatalytic Water Splitting with MTiO 2 Catalysts. *ChemistrySelect* **2020**, *5*, 1013-1019.

- Beasley, C.; Gnanamani, M.; Martinelli, M.; Góra-Marek, K.; Hamano, K.; Shafer, W.; **Wanninayake, N.**; Kim, D. Dehydration of 1,5-Pentanediol over ZrO2 -ZnO Mixed Oxides. *ChemistrySelect* **2019**, *4*, 3123-3130.

- Khan, M.; Islam, S.; Nagpure, S.; He, Y.; **Wanninayake, N.**; Palmer, R.; Strzalka, J.; Kim, D.; Knutson, B.; Rankin, S. Epitaxial Formation Mechanism of Multilayer TiO2 Films with Ordered Accessible Vertical Nanopores by Evaporation-Driven Assembly. *The Journal of Physical Chemistry C* **2019**, *124*, 1958-1972.

- Pillar-Little, T.; **Wanninayake, N.**; Nease, L.; Heidary, D.; Glazer, E.; Kim, D. Superior photodynamic effect of carbon quantum dots through both type I and type II pathways: Detailed comparison study of top-down-synthesized and bottom-up-synthesized carbon quantum dots. *Carbon* **2018**, *140*, 616-623.

- Colburn, A.; **Wanninayake, N.**; Kim, D.; Bhattacharyya, D. Cellulose-graphene quantum dot composite membranes using ionic liquid. *Journal of Membrane Science* **2018**, *556*, 293-302.

- Islam, S.; Reed, A.; Nagpure, S.; **Wanninayake, N.**; Browning, J.; Strzalka, J.; Kim, D.; Rankin, S. Hydrogen incorporation by plasma treatment gives mesoporous black TiO2 thin films with visible photoelectrochemical water oxidation activity. *Microporous and Mesoporous Materials* **2018**, *261*, 35-43.

- Li, W.; Zhang, Y.; Das, L.; Wang, Y.; Li, M.; **Wanninayake, N.**; Pu, Y.; Kim, D.; Cheng, Y.; Ragauskas, A. et al. Linking lignin source with structural and electrochemical properties of lignin-derived carbon materials. *RSC Advances* **2018**, *8*, 38721-38732.

- Islam, S.; Reed, A.; **Wanninayake, N.**; Kim, D.; Rankin, S. Remarkable Enhancement of Photocatalytic Water Oxidation in N2/Ar Plasma Treated, Mesoporous TiO2 Films. *The Journal of Physical Chemistry C* **2016**, *120*, 14069-14081.

- **Wanninayake, N.**; Karunaratne, V.; Karunaratne, N. Preparation of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) (PHBV) nanospheres for the sustained release of Folic Acid. (*Peradeniya University Research Sessions*) PURSE **2012**, Volume 17, 188, ISSN: 1391-4111, ISBN: 978-955-589-164-6.

In Preparation

- **Wanninayake, N.**; Ai, Q.; Thomas, M.; Kodithuwakku, U.; Hoque, M.; Guzman, M.; Guiton, B.; Risko, C.; Kim, D. Nitrogen and Sulfur Co-doped Carbon Nano-Onions for efficient Electrochemical Conversion of Carbon Dioxide.

- **Wanninayake, N.**; Albrecht, S.; Kodithuwakku, U.; Hoque, M.; Guzman, M.; Kim, D. Efficient, selective and stable electrocatalytic conversion of CO2 into multi-carbon products with metal nanoparticle supported heteroatom-doped carbon nano onions.

CONFERENCE PRESENTATIONS

Oral Presentations

- **Namal Wanninayake**, Ai Qianxiang, Melonie Thomas, Udari Shyamika Kodithuwakku, Ariful Hoque, Marcelo I. Guzman, Beth Guiton, Chad Risko and Doo Young Kim. Nitrogen and Sulfur Co-Doped Carbon Nano-Onions for Efficient Electrochemical Conversion of Carbon Dioxide. 235th ECS meeting, Dallas, Carbon Dioxide Conversion symposium 1 - May 26, **2019**.

- **Namal Wanninayake**, Sidney Herrell, Ruixin Zhou, Ariful Hoque, Marcelo Guzman, Doo Young Kim. Nitrogen-Doped sp^2/sp^3 Hybrid Carbon Films for Electrocatalytic Reduction of Carbon Dioxide, 2017 Fall Materials Research Society Meeting and Exhibit, Hynes Convention Center, Boston, Massachusetts, November 30, **2017**.

- **Namal Wanninayake**, Veranja Karunaratne, Nedra Karunaratne, Preparation of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) (PHBV) nanospheres for the sustained release of Folic Acid, Peradeniya University Research Sessions, Sri Lanka, 4th July **2013**.

Poster Presentations

- **Namal Wanninayake**, Syed Z. Islam, Allen Reed, Joseph Strzalka, Stephen E. Rankin * Doo Young Kim. Graphene Quantum Dots Immobilized Mesoporous N-TiO_2 Thin Films for Efficient Photocatalytic Water Oxidation, 2017 Fall Materials Research Society Meeting and Exhibit, Hynes Convention Center, Boston, Massachusetts, November 27, **2017**.

- **Namal Wanninayake**, Syed Z. Islam, Allen Reed, Stephen E. Rankin, and Doo Young Kim, Graphene Quantum Dot Immobilized Nanoporous N-TiO_2 Thin Films for Efficient Photocatalytic Water Splitting, Pittcon Conference and Expo **2016**, Atlanta, GA, USA.

- **Namal Wanninayake,** Andrew Colburn, Minghui Gui, Dibakar Bhattacharyya, Doo young Kim Immobilization of Graphene Quantum Dots (GQDs) on the Surface of Metal Oxide Substrates or Polymeric Membranes, NAMS Conference **2015**, Boston, MA, USA.

PROFESSIONAL ASSOCIATIONS

Member, American Chemical Society	2019-present
Member, American Carbon Society	2019-present
Member, Electrochemical Society	2019-present
Treasurer, Chemistry Graduate Student Association, University of Kentucky	2018-2019
Member, Materials Research Society	2017-2018
Member, North American Membrane Society	2015-2018

OUTREACH ACTIVITIES

Volunteer, international graduate students' orientation, University of Kentucky — 2019, August 13th
Shared international student experience among all new international students at the college of arts and science to ease their transition into grad school.

Volunteer, Expanding Your Horizons STEM conference, University of Kentucky. — 2018, April 21st
Assisted to conduct experiments for attendants.

Volunteer, Crawford Middle School Science Night, Lexington KY. — 2017, Jan 31st
Demonstrated and explained several science experiments to middle schoolers inspiring the young generation toward science.

Volunteer, Connection team member, Department of Chemistry, University of Kentucky. — Fall-2016, Fall-2017
Assisted international incoming graduate student events.

Volunteer, Graduate student recruitments, Department of Chemistry, University of Kentucky — 2017, Mar 25-26
Advised recruits regarding life in grad school.

Volunteer, Demo show, Department of Chemistry, University of Kentucky. — 2015, Oct 23rd
Conducted scientific experiments and explained the scientific principles to the audience.