INDIKA U. ARACHCHIGE, Ph. D.

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EDUCATION

- Ph.D., Inorganic Materials Chemistry, (2007) Wayne State University, Detroit, Michigan. Dissertation: "Sol-Gel Routes for Metal Chalcogenide Nanoparticle Assembly"
- B.Sc. (Honors) in Chemistry, (2001) University of Kelaniya, Sri Lanka.

RESEARCH EXPERIENCE AND PROFESSIONAL APPOINTMENTS

07/2017 - present	Associate Professor, Virginia Commonwealth University
08/2011 - 06/2017	Assistant Professor, Virginia Commonwealth University
04/2009 - 08/2011	Postdoctoral Research Associate, Los Alamos National Laboratory
08/2007 - 03/2009	Postdoctoral Research Fellow, Northwestern University
08/2002 - 07/2007	Graduate Research/Teaching Assistant, Wayne State University
01/2001 - 07/2002	Graduate Research/Teaching Assistant, University of Kelaniya, Sri Lanka

AWARDS AND FELLOWSHIPS

- National and International Recognition Award offered by VCU Office of the Provost, 2023
- VCU College of Humanities and Sciences – Excellence in Scholarship Award, 2017
- Esther and Stanley Kirschner Outstanding Graduate Student Award, 2007
- Wilfred Heller Outstanding Graduate Research Fellowship, Wayne State University, 2006-2007
- Dissertation Research Fellowship, Graduate School, Wayne State University, 2006

TEACHING EXPERIENCE AND COURSE DEVELOPMENT

1. **CHEM 622 Solid State and Materials Chemistry** (Spring 2015−16 and Spring 2018−23)
    - Developed a new course on solid state and materials chemistry for senior undergraduate and graduate students. Topics discussed include amorphous and crystalline solids, crystal structures, unit cells and packing, Miller indices, crystallographic directions and planes, crystal defects and non-stoichiometric compounds, phase diagrams and solid solutions, band structure and theory, powder X-ray diffraction and X-ray crystallography.
    - Developed a module in which students are required to write a review on an anonymized paper submitted to an ACS or RSC journal, critically analyze the strengths and weaknesses, and make recommendation for publication. In addition to grading by the instructor, part of the literature critique assignment score was based on peer-review by their classmates.

2. **CHEM 620 Advanced Inorganic Chemistry II** (Fall 2011–13, Fall 2014–15, and Fall 2016)
    - Incorporated fundamental principles of solid-state, organometallic, and nanochemistry into the traditional inorganic graduate level course. Used models to understand packing in solids and the internet to access short, public domain courses on the structures of solids and structure-property and size-property relationships of nanostructured and bulk materials.
    - Developed a module in which students are required to write a mini review or a proposal on a topic related to research conducted by VCU faculty. In addition to grading by the instructor, part of their assignment score was based on peer-review by their classmates.
    - Incorporated a literature presentation module in which students are required to conduct a literature search on a topic related to Inorganic Chemistry and present their findings.

3. **CHEM 102 General Chemistry II** (Spring 2012–13, Fall 2014–15, and Fall 2022)
    - Prepared a series of PowerPoint lectures including a collection of hot materials topics/videos to accompany the text for CHEM 102 and provided them to students online via Canvas.

4. **CHEM 320 Inorganic Chemistry I** (Spring 2017 and Fall 2017−2021)
   - Prepared a series of PowerPoint lectures including a collection of online inorganic topics to accompany the CHEM 320 textbook and provided them to students via Blackboard/Canvas.
   - Developed a series of online homework, clicker and study question sets to practice specific concepts taught in class and evaluated student performance throughout the semester.

5. **Undergraduate, Masters and Doctoral Theses/Dissertations Directed**
   - **Rajib Sarkar,** Ph.D. in Chemistry, "Colloidal Synthesis of Noble Metal Nanoparticle Aerogels and Transition Metal Phosphide Nanocrystals as High Efficiency Electrocatalysts for Sustainable Energy Applications" May 2023.
   - **Drew Spera,** Ph.D. in Nanoscience and Nanotechnology, ''Synthesis and Characterization of $Ge_{1-x-y}Si_ySn_x$ Core and $Ge_{1-x}Sn_x$@SiO2 Core-Shell Group IV Semiconductor Nanocrystals" May 2023.
   - **Rachel Barbieri,** Ph.D. in Nanoscience and Nanotechnology, "Direct-gap Group IV Alloys and Quantum Dots: Synthesis, Thin Film Fabrication, and Optical and Electrical Characterization" May 2022.
   - **Ebtesam H. A. Eladgham,** Ph.D. in Chemistry "Structure, Morphology and Composition-Property Elucidation of Ni–Mo and Ni−Mo−P Nanocrystals for Water Splitting Reactions and Group IV Alloy and Silicate Nanocrystals for Visible to Near IR Optoelectronics" May 2020.
   - **Venkatesham Tallapally**, Ph.D. in Chemistry**,** "Colloidal Synthesis and Photophysical Characterization of Group IV Alloy and Group IV-V Semiconductors: Ge-Sn and Sn-P Quantum Dot" August 2018.
   - **Christopher Ohlhaver**, M. Sc. in Chemistry, "Detection of 20-Hydroxyeicosatetraenoic Acid by Use of Surface Enhanced Raman Spectroscopy: Substrate Development and Detection" August 2018.
   - **Lamia Nahar**, Ph.D. in Chemistry, "Sol-Gel Chemistry: An Advanced Technique to Produce Macroscopic Nanostructures of Metal and Semiconductor Colloids" May 2017.
   - **Dilhara Liyanage**, M. Sc. in Chemistry, "Efficient Integration of Plasmonic and Excitonic Properties of Metal and Semiconductor Nanostructures via Sol-Gel Assembly" May 2017.
   - **Richard J Alan Esteves**, Ph. D. in Nanoscience and Nanotechnology, "The Dawn of New Quantum Dots: Synthesis and Characterization of $Ge_{1-x}Sn_x$ Nanocrystals for Tunable Bandgaps", December 2016.
   - **Xiaonan Gao**, Ph. D. in Chemistry, "Sol-Gel Assembly of Metal Nanostructures into Metallic Gel Frameworks and Their Applications", May 2016.
   - **Jordan N. Nowaczyk**, B. Sc. (Honors) in Chemistry, "Synthesis and Characterization of Ag/Pd/Au Alloy Nanoparticles and Their Self-Assembly into Aerogels", May 2016.
   - **Minh Q. Ho**, M. Sc. in Chemistry, "Colloidal Synthesis and Optical Characterization of Semiconductor Nanocrystals from Non-Toxic Elements", December 2015.

RESEARCH INTERESTS AND SUPPORT

A. Funded Research Grants/Awards (PI = Principal Investigator)

Agency	Funding	Time period	Title/Role of the grant
VCU Momentum Fund	$200,000 (direct)	07/01/2023-06/30/2025	**Title:** "Superatomic Transition Metal Clusters and Nanoparticles as High-Efficiency, Earth-Abundant, and Durable Electrocatalysts for Producing Sustainable Hydrogen Fuel from Water and Electricity" **Role: Arachchige, PI**; Jena and Gupta, Co-PIs

National Science Foundation - Division of Chemistry (CHE- 2154747)	$429,412 (total)	08/15/2022-07/31/2025	**Title:** CAS: Bimetallic Transition Metal Phosphide Nanostructures as High-Efficiency, Earth-Abundant, and Durable Catalysts for Electrochemical Water Splitting. **Role: Arachchige, PI**; Lao, Co-PI
National Science Foundation-Division of Materials Research (DMR-2211606)	$499,912 (total)	07/01/2022-06/30/2025	**Title:** Low-Dimensional Si-Sn and Si-Ge-Sn Nanoalloys as High-Efficiency, Direct-gap Nanostructures for Visible to Infrared Optoelectronics. **Role: Arachchige, PI;** Özgür and Lao, Co-PIs.
Presidential Research Quest Fund (PRQF)	$50,000 (direct)	07/01/2021-12/31/2022	**Title:** Bimetallic Transition Metal Phosphide Nanostructures as High-Efficiency, Earth Abundant Catalysts for Electrochemical Water Splitting. **Role: Arachchige, PI;** Lao, Co-PI
VCU Commercialization Fund	$28,000 (direct)	01/01/2020-12/31/2020	**Title:** Si-Sn and Ge-Sn Quantum Dots as Low-Cost, High-Efficiency Light Harvesting Materials for Generation-III Photovoltaics. **Role: Arachchige, single PI**
National Science Foundation - Chemistry (CHE-1851916)	$312,309 (total)	04/01/2019-03/31/2023	**Title:** REU Site: Practices and Perspectives in Nanoscience and Chemical Biology. **Role: Arachchige, PI;** Ruder, co-PI
College of Humanities and Sciences-Catalyst Award	$20,000 (direct)	02/01/2018-08/31/2019	**Title:** Low-Dimensional $Si_{1-x}Sn_y$ Alloys for Low-Cost and High-Efficiency Solar Cells. **Role: Arachchige, single PI**
National Institute of Child Health and Human Development /NIH/DHHS (1U01HD087198-01)	$4,228,935 (total)	09/17/2015-08/31/2019	**Title:** The Utilization of Photonic Technology to Rapidly Detect Bioactive Lipids Associated with Preeclampsia Development. **Role: Arachchige, Co-I;** Chalfant, Charles E.; PI; Walsh, Scott, PI; Wijesinghe, Shanaka, PI. This is a multi-PI grant.
National Science Foundation-Division of Materials Research (DMR-1506595)	$389,074 (total)	06/01/2015-05/31/2019	**Title:** SusChEM: Synthesis and Structure-Property Elucidation of Direct-Bandgap Group IV Alloy Nanocrystals for Optoelectronic Applications. **Role: Arachchige, PI**; Özgür and Demchenko, Co-PIs
American Chemical Society: Petroleum Research Fund (52423-DNI10)	$100,000 (direct)	09/01/2012-08/31/2015	**Title:** Sol-Gel Assembly of Metal Particles into a New Class of Porous Nanostructures and Their Application in Heterogeneous Catalysis. **Role: Arachchige, single PI**
Presidential Research Quest Fund (PRQF)	$50,000 (direct)	07/01/2013-12/31/2014	**Title:** Direct-gap Group IV Nanocrystals as Cheap and Efficient Materials for Optoelectronic Applications. **Role: Arachchige, single PI**

B. Research in Progress

- Synthesis of Direct-Gap Group IV Semiconductor Nanocrystals for Application in High-Efficiency Optoelectronics.
- Direct Self-Supported Assembly of Noble Metal Nanoparticles into High-Surface-Area, Hierarchically Porous, Highly Conducting Superstructures (Aerogels) for Application in Surface Enhanced Raman Scattering and Heterogeneous Catalysis.
- Synthesis of Metal-Semiconductor Hybrid Nanostructures for Efficient Integration of Plasmonic and Excitonic Properties for Enhanced Light-Matter Interactions.
- Main Group and Transition Metal Phosphide Nanostructures as High-Efficiency, Earth-Abundant, and Durable Electrocatalysts for Producing Hydrogen from Water and Electricity.

C. Fellowships Received for Graduate Advisees under the Direction of Dr. Arachchige

- Graduate School Dissertation Assistantship, Spring 2023 ($9,375 + tuition, **Rajib Sarkar**)
- Graduate School Dissertation Assistantship, Spring 2023 ($9,375 + tuition, **Drew Spera**)
- Altria Research Fellowship, 2021/22 ($19,000 + tuition, **Rajib Sarkar**)
- Altria Research Fellowship, 2019/20 ($19,000 + tuition, **Ebtesam Eladgham**)
- Altria Research Fellowship, 2017/18 ($18,000 + tuition/fees, **Venkatesham Tallapally**)
- Graduate School Dissertation Assistantship, 2016/17 ($17,250 + tuition/fees, **Lamia Nahar**)
- Graduate School Dissertation Assistantship, 2016 ($8,625 + tuition/fees, **Richard Esteves**)
- Altria Research Fellowship, 2015/16 ($17,000 + tuition/fees, **Lamia Nahar**)
- Fred M. Hawkridge Summer Fellowship, 2015 ($5,500 + fringe**, Lamia Nahar**)
- Altria Research Fellowship, 2014/15 ($17,000 + tuition/fees, **Xiaonan Gao**)

D. VCU Undergraduate Research and Creative (UROP) Scholarships Received for Advisees:

Shihara Dewasinghe (summer 2017); **Piotr Woźniak** (summer 2017);
Nilan Vaghjiani (summer 2016); and **Robert Haufler** (summer 2015).

PEER-REVIEWED JOURNAL ARTICLES (Citations >2800; h-index = 27; IF = Journal Impact Factor)

A1. Publications at VCU (Undergraduate co-authors are bold, *Corresponding author)

A1.2 Articles Published at VCU

1. Spera, Drew Z.; Pate, David; Spence, Griffin C.; Villot, Corentin; Onukwughara, Chineme J.; **White, Daulton**; Lao, Ka. U.; Özgür, Ümit; Arachchige, Indika U.* "Colloidal Synthesis of Homogeneous $Ge_{1-x-y}Si_ySn_x$ Nanoalloys with Composition-Tunable Visible to Near IR Optical Properties" ***Chem. Mater.*** accepted.
DOI: https://doi.org/10.1021/acs.chemmater.3c01644 **[IF: 10.5]**

2. Sarkar, Rajib; Graves, Lisa S.; **Taylor, Jessie R.**; Arachchige, Indika U.* "Self-Supported Ag/Pt/Pd Alloy Aerogels as High Performance Bifunctional and Durable Electrocatalysts for Methanol and Ethanol Oxidation Reactions" ***ACS Appl. Mater. Interfaces*** accepted.
DOI: https://doi.org/10.1021/acsami.3c07740 **[IF: 10.3]**

3. Graves, Lisa, S.; Sarkar, Rajib; Lao, Ka U.; Arachchige, Indika U.* "Composition-Dependent Electrocatalytic Activity of Zn-doped Ni_5P_4 Nanocrystals for the Hydrogen Evolution Reaction" ***Chem. Mater.*** 2023, 35, 17, 6966–6978. **DOI:** 10.1021/acs.chemmater.3c01229 **[IF: 10.5]**

4. Spence, Griffin C.; Barbieri, Rachel C.; Pate, David; Graves, Lisa S.; Özgür, Ümit; Arachchige, and Indika U.* “Sn-Induced Synthesis of Highly Crystalline and Size-Confined Si Nanorods at Moderately High Temperatures Using Hydrogen Silsesquioxane” ***J. Phys. Chem. C 2023***, 127, 11579–11590. **DOI:** https://doi.org/10.1021/acs.jpcc.3c01308 **[IF: 4.2]**

5. Sarkar, Rajib; Farghaly, Ahmed; Arachchige, Indika U.* “Oxidative Self-Assembly of Au/Ag/Pt Alloy NPs into High Surface Area, Mesoporous, and Conductive Aerogels for Methanol Electro-Oxidation” ***Chem Mater. 2022,*** 34, 5874–5887.
DOI: https://doi.org/10.1021/acs.chemmater.2c00717 **[IF: 10.5]**

6. Spera, Drew Z.; Arachchige, Indika U.* "Improved Surface Passivation of Colloidal $Ge_{1-x}Sn_x$ Nanoalloys Through Amorphous SiO_2 Shell Growth” ***J. Phys. Chem. C 2022,*** 126, 9862–9874.
DOI: https://doi.org/10.1021/acs.jpcc.2c00063 **[IF: 4.2]**

7. Barbieri, Rachel; Ding, Kai; Ozgur, Ümit; Arachchige, Indika U.* "Solution-Processed $Ge_{1-x}Sn_x$ Alloy Nanocrystal Thin Films with High Electrical Conductivity and Tunable Energy Gaps"
Chem Mater. 2021, 33, 6897–6908.
DOI: https://doi.org/10.1021/acs.chemmater.1c01836 **[IF: 10.5]**

8. Liyanage, Dilhara; Spera, Drew Z.; Sarkar, Rajib; **Troesch, Brendan P.**; Nakagawara, Tanner A.; Özgür, Ümit; Arachchige, Indika U.* “CdSe/Ag Hybrid Aerogels: Integration of Plasmonic and Excitonic Properties of Metal–Semiconductor Nanostructures via Sol–Gel Assembly” ***Adv. Photonics Res. 2021***, 2100084. **DOI**: https://doi.org/10.1002/adpr.202100084 **[IF: 3.7]**

9. Eladgham, Ebtesam H.; Rodene, Dylan, D.; Sarkar, Rajib; Arachchige, Indika U.* Gupta, Ram B. “Electrocatalytic Activity of Bimetallic Ni-Mo-P Nanocrystals for Hydrogen Evolution Reaction” ***ACS Appl. Nano Mater. 2020***, 3, 8199–8207.
DOI: https://doi.org/10.1021/acsanm.0c01624 **[IF: 6.1]**

10. Spera, Drew Z.; Arachchige, Indika U.* “Synthesis, Properties, and Applications of Zero and One Dimensional GeSn Nanostructures” ***J. Vac. Sci. Technol. B 2020***, 38, 030802/1–030802/7.
DOI: https://doi.org/10.1116/6.0000040 **[IF: 1.5]**

11. Rodene, Dylan, D.; Eladgham, Ebtesam H.; Gupta, Ram B., Arachchige, Indika U.* Tallapally, Venkatesham “Crystal Structure and Composition-Dependent Electrocatalytic Activity of Ni–Mo Nanoalloys for Water Splitting to Produce Hydrogen” ***ACS Appl. Energy Mater. 2019***, 2, 7112–7120. **DOI:** https://doi.org/10.1021/acsaem.9b01043 **[IF: 6.9]**

12. Eladgham, Ebtesam H.; Demchenko, Denis O.; Nakagawara, Tanner A.; Özgür, Ümit; Arachchige, Indika U.* “Facile Synthesis of Highly Luminescent Lithium Silicate Nanocrystals with Varying Crystal Structure and Morphology” ***CrystEngComm. 2019,*** 21, 1974–1983.
DOI: https://doi.org/10.1039/C8CE02120A **[IF: 3.8]**

13. Tallapally, Venkatesham; Nakagawara, Tanner A.; Demchenko, Denis O.; Ümit Özgür; Arachchige, Indika U.* “$Ge_{1-x}Sn_x$ Alloy Quantum Dots with Composition-Tunable Energy Gaps and Near-Infrared Photoluminescence” ***Nanoscale 2018****,* 10, 20296–20305.
DOI: https://doi.org/10.1039/C8NR04399J **[IF: 8.3]**

14. Ohlhaver, Christopher M.; Rutan, Sarah A.; Bertino; Massimo F.; Wijesinghe, Dayanjan S.; Arachchige, Indika U.* “Applications of Surface Enhanced Raman Scattering toward the Detection of the Bioactive Lipid 20-HETE” ***ACS Appl. Nano Mater. 2018***, 1, 4064–4072.
DOI: https://doi.org/10.1021/acsanm.8b00840 **[IF: 6.1]**

15. Nahar, Lamia; Farghaly, Ahmed A.; Esteves, Richard A; Arachchige, Indika U.* "Shape Controlled Synthesis of Au/Ag/Pd Nanoalloys and Their Oxidation-Induced Self-Assembly into Electrocatalytically Active Aerogel Monoliths" ***Chem. Mater. 2017***, 29, 7704−7715. **DOI:** https://doi.org/10.1021/acs.chemmater.7b01731 **[IF: 10.5]**

16. Demchenko, Denis O.;* Tallapally, Venkatesham; Esteves, Richard J.; Hafiz, Shopan; Nakagawara, Tanner A.; Arachchige, Indika U.; Ümit Özgür "Optical Transitions and Excitonic Properties of $Ge_{1-x}Sn_x$ Alloy Quantum Dots" ***J. Phys. Chem. C 2017***, *121*, 18299–18306. **DOI:** https://doi.org/10.1021/acs.jpcc.7b06458 **[IF: 4.2]**

17. Arachchige, Indika U.; Armatas G. S.; Biswas, K.; Subrahmanyam, K. S.; Latturner, S.; Malliakas, C. D.; Manos, M. J.; Oh, Y.; Polychronopoulou, P.; Poudeu, P. F. P.; Trikalitis, P. N.; Zhang, Q.; Zhao, L.-D.; Peter, S. C.,* "Mercouri G. Kanatzidis: Excellence and Innovations in Inorganic and Solid State Chemistry" ***Inorg. Chem. 2017***, *56*, 7582–7597. **DOI:** https://doi.org/10.1021/acs.inorgchem.7b00933 **[IF: 5.4]**

18. Esteves, Richard J.; Hafiz, Shopan A.; Demchenko, Denis O.; Özgür, Ümit; Arachchige, Indika U.* "Ultra-Small $Ge_{1-x}Sn_x$ Quantum Dots with Visible Photoluminescence" ***Chem. Commun. 2016*****,** 52, 11665–11668. **DOI:** https://doi.org/10.1039/C6CC04242B **[IF: 6.1]**

19. Hafiz, Shopan A.; Esteves, Richard J.; Demchenko, Denis O.; Arachchige, Indika U.; Özgür, Ümit* "Energy-Gap Tuning and Carrier Dynamics in Colloidal $Ge_{1-x}Sn_x$ Quantum Dots" ***J. Phys. Chem. Lett. 2016*****,** 7, 3295−3301. **DOI:** https://doi.org/10.1021/acs.jpclett.6b01333 **[IF: 6.9]**

20. Tallapally, Venkatesham; Esteves, Richard J.; Nahar, Lamia; Arachchige, Indika U.* "Multivariate Synthesis of Tin Phosphide Nanoparticles: Temperature, Time, and Ligand Control of Size, Shape, and Crystal Structure" ***Chem. Mater. 2016***, 28, 5406–5414. **DOI:** https://doi.org/10.1021/acs.chemmater.6b01749 **[IF: 10.5]**

21. Sahoo, Nanda G.; Esteves, Richard J.; Punetha, Vinay D.; Pestov, Dimtry; Arachchige, Indika U.; McLeskey, James T.* "Schottky Diodes from 2D Germanane" ***Appl. Phys. Lett. 2016***, 109, 023507/1–023507/4. **DOI:** http://dx.doi.org/10.1063/1.4955463 **[IF: 4.0]**

22. Gao, Xiaonan; Esteves, Richard J.; Nahar, Lamia; **Nowaczyk, Jordan N.**; Arachchige, Indika U.***** "Direct Cross-Linking of Au/Ag Alloy Nanoparticles into Monolithic Aerogels for Application in Surface Enhanced Raman Scattering" ***ACS Appl. Mater. Interfaces 2016***, 8, 13076–13085. **DOI:** https://doi.org/10.1021/acsami.5b11582 **[IF: 10.3]**

23. Nahar, Lamia; Esteves, Richard J.; Hafiz, Shopan; Özgür, Ümit; Arachchige, Indika U.***** "Metal-Semiconductor Hybrid Aerogels: Evolution of Optoelectronic Properties in a Low Dimensional CdSe/Ag Nanoparticle Assembly" ***ACS Nano 2015***, 9, 9810–9821. **DOI:** https://doi.org/10.1021/acsnano.5b02777 **[IF: 18.0]**

24. Ho, Min Q.; Esteves, Richard J.; Kedarnath, Gotluru; Arachchige, Indika U.***** "Size Dependent Optical Properties of Luminescent Zn_3P_2 Nanocrystals" ***J. Phys. Chem. C. 2015***, 119, 10576−10584. **DOI:** https://doi.org/10.1021/acs.jpcc.5b01747 **[IF: 4.2]**

25. Esteves, Richard J.; Ho, Min Q.; Arachchige, Indika U.***** "Nanocrystalline Group IV Alloy Semiconductors: Synthesis and Characterization of $Ge_{1-x}Sn_x$ Quantum Dots for Tunable Bandgaps" ***Chem. Mater. 2015***, 27, 1559–1568. **DOI:** https://doi.org/10.1021/cm503983b **[IF: 10.5]**

26. Altarawneh, Suha; Nahar, Lamia; Arachchige, Indika U.;***** El-Ballouli, Ala'a O.; Hallal, Kassem M.; Kaafarani, Bilal R.;***** Rabbani, Mohammad G.; Arvapally, Ravi K.; El-Kaderi, Hani M.***** "Highly Porous and Photoluminescent Pyrenequinoxaline-Derived Benzimidazole-Linked Polymers" ***J. Mater. Chem. A 2015***, 3, 3006–3010. **DOI:** https://doi.org/10.1039/C4TA05727A **[IF: 14.5]**

27. Gao, Xiaonan; Esteves, Richard J.; **Luong, Thi T. H.**; **Jaini, Rajendra**; Arachchige, Indika U.***** "Oxidation-Induced Self-Assembly of Ag Nanoshells into Transparent and Opaque Ag Hydrogels and Aerogels" ***J. Am. Chem. Soc. 2014***, 136, 7993–8002. **DOI:** https://doi.org/10.1021/ja5020037 **[IF: 16.3]**

28. Kulugammana, Ranmohotti G.; Gao, Xiaonan; Arachchige, Indika U.***** "Salt-Mediated Self-Assembly of Metal Nanoshells into Metallic Aerogels" ***Chem. Mater. 2013***, 25, 3528–3534. **DOI:** https://doi.org/10.1021/cm401968j **[IF: 10.5]**

29. Nahar, Lamia; Arachchige, Indika U.***** "Sol-Gel Methods for the Assembly of Metal and Semiconductor Nanoparticles" ***JSM Nanotechnol. Nanomed. 2013***, 1, 1004/1–1004/6. **DOI:** https://doi.org/10.47739/2334-1815/1004

A2. Publications from Undergraduate, Graduate, and Postdoctoral Research

30. Soriano, Ronlad A.; Arachchige, Indika U.; Malliakas, Christos D.; Wu, Jinsong; Kanatzidis, Mercouri G.***** "Nanoscale Stabilization of New Phases in the PbTe–Sb_2Te_3 System: $Pb_mSb_{2n}Te_{m+3n}$ Nanocrystals" ***J. Am. Chem. Soc. 2013,*** 135*,* 768–774. **DOI:** https://doi.org/10.1021/ja309626q **[IF: 16.3]**

31. Ivanov, Sergei A.;***** Arachchige, Indika U.; Aikens, Christine M.***** "Density Functional Analysis of Geometries and Electronic Structures of Gold-Phosphine Clusters. The Case of $Au_4(PR_3)_4^{2+}$ and $Au_4(\mu_2\text{-}I)_2(PR_3)_4$" ***J. Phys. Chem. A 2011***, 115, 8017–8031. **DOI:** https://doi.org/10.1021/jp200346c **[IF: 2.9]**

32. Arachchige, Indika U.; Malliakas, Christos D.; Soriano, Ronlad A.; Ivanov, Sergei A.; Kanatzidis, Mercouri G.***** "Amorphous and Crystalline GeTe Nanoparticles" ***Adv. Funct. Mater. 2011,*** 21, 2737–2743. **DOI:** https://doi.org/10.1002/adfm.201100633 **[IF: 19.9]**

33. Wu, Jinsong;* He, Jiaqing; Han, Mi-Kyung; Sootsman, Joseph R.; Girard, S.; Arachchige, Indika U.; Kanatzidis, Mercouri G.; Dravid, Vinayak P., "Electron-Beam Activated Thermal Sputtering of Thermoelectric Materials" ***J. Appl. Phys. 2011***, 110, 044325/1–044325/6. **DOI:** https://doi.org/10.1063/1.3624755 **[IF: 2.9]**

34. Wang, Ruomiao; Li, Li; Arachchige, Indika U.; Ganguly, Shreyashi; Brock, Stephanie L.; Mao, Guangzhao,* "Nanoparticles Change the Ordering Pattern of n-Carboxylic Acids into Nanorods on HOPG" ***ACS Nano 2010***, 4, 6687–6696. DOI: 10.1021/nn102184y **[IF: 18.0]**

35. Pala, Irina R.; Arachchige, Indika U.; Georgiev, Daniel G.; Brock, Stephanie L.***** "Reversible Gelation of II-VI Nanocrystals: The Nature of Interparticle Bonding and the Origin of Nanocrystal Photochemical Instability" ***Angew. Chem. Int. Ed. 2010,*** 49, 3661–3665. **DOI:** https://doi.org/10.1002/anie.201000034 **[IF: 16.8]**

36. Arachchige, Indika U.; Kanatzidis, Mercouri G.***** "Anomalous Band Gap Evolution from Band Inversion in $Pb_{1-x}Sn_xTe$ Nanocrystals" ***Nano Lett. 2009,*** 9, 1583–1587. **DOI:** https://doi.org/10.1021/nl8037757 **[IF: 12.3]**

37. Yao, Qinghong; Arachchige, Indika U.; Brock, Stephanie L.***** "Expanding the Repertoire of Chalcogenide Nanocrystal Networks: Ag_2Se Gels and Aerogels by Cation Exchange Reactions" ***J. Am. Chem. Soc. 2009,*** 131*,* 2800–2801. **DOI:** https://doi.org/10.1021/ja900042y **[IF: 16.3]**

38. Arachchige, Indika U.; Wu, Jinsong; Dravid, Vinayak P.; Kanatzidis, Mercouri G.***** "Nanocrystals of the Quaternary Thermoelectric Materials $AgPb_mSbTe_{m+2}$ (m=1-18): Phase-Segregated or Solid Solutions?" ***Adv. Mater. 2008,*** 20, 3638–3642.
DOI: https://doi.org/10.1002/adma.200801116 **[IF: 32.0]**

39. Bag, Santanu; Arachchige, Indika U.; Kanatzidis, Mercouri G.,* "Aerogels from Metal Chalcogenides and Their Emerging Unique Properties" ***J. Mater. Chem. 2008,*** 18, 3628–2632.
DOI: https://doi.org/10.1039/B804011G **[IF: 14.5]**

40. Arachchige, Indika U.; Brock, Stephanie L.***** "Highly Luminescent Quantum Dot Monoliths" ***J. Am. Chem. Soc. 2007,*** 129, 1840–1841. (Highlighted by ***Science 2007,*** 315, 741).
DOI: https://doi.org/10.1021/ja066749c **[IF: 16.3]**

41. Arachchige, Indika U.; Brock, Stephanie L.***** "Sol-Gel Assembly of CdSe Nanoparticles to Form Porous Aerogel Networks" ***J. Am. Chem. Soc. 2006,*** 128, 7964–7971. (Highlighted by ***Anal. Chem. 2006,*** 78, 5975). **DOI:** https://doi.org/10.1021/ja061561e **[IF: 16.3]**

42. Arachchige, Indika U.; Mohanan, Jaya L.; Brock, Stephanie L.***** "Sol-Gel Processing of Semiconducting Metal Chalcogenide Xerogels: Influence of Dimensionality on Quantum Confinement Effects in a Nanoparticle Network" ***Chem. Mater. 2005,*** 17, 6644–6650.
DOI: https://doi.org/10.1021/cm0518325 **[IF: 10.5]**

43. Mohanan, Jaya L.; Arachchige, Indika U.; Brock, Stephanie L.***** "Porous Semiconductor Chalcogenide Aerogels" ***Science 2005,*** 307, 397–400. **DOI:** 10.1126/science.1104226 **[IF: 63.7]**

44. Chen, Dongzhong; Wang, Ruomiao; Arachchige, Indika U.; Mao, Guangzhao;* Brock, Stephanie L., "Particle–Rod Hybrids: Growth of Arachidic Acid Molecular Rods from Capped Cadmium Selenide Nanoparticles" ***J. Am. Chem. Soc. 2004,*** 126, 16290–16291.
DOI: https://doi.org/10.1021/ja045011x **[IF: 16.3]**

45. Weerasooriya, R.;* Tobschall, H. J.; Wijesekara, H. K. D. K; Arachchige, E. K. I. A. U. K.; Pathiratne, K. A. S., "On the Mechanistic Modeling of As(III) Adsorption on Gibbsite" ***Chemosphere 2003,*** 51, 1001–1013*.*
DOI: https://doi.org/10.1016/S0045-6535(03)00157-7 **[IF: 8.9]**

B. Invited Review Articles

46. Arachchige, Indika U.; Brock, Stephanie L.* "Sol-Gel Method for the Assembly of Metal-Chalcogenide Quantum Dots" ***Acc. Chem. Res. 2007,*** 40, 801–809.
DOI: https://doi.org/10.1021/ar600028s **[IF: 24.5]**

47. Brock, Stephanie L.;* Arachchige, Indika U.; Kalebaila, Kennedy K., "Metal Chalcogenide Gels, Xerogels and Aerogels" ***Comments Inorg. Chem. 2006,*** 27, 103–126.
DOI: https://doi.org/10.1080/02603590601084434 **[IF: 5.5]**

C. Patents

48. Arachchige, Indika U.; Özgür, Umit; Demchenko, Denis O.; Tallapally, Venkatesham; Nakagawara Tanner A. "Direct-Gap Group IV Alloy Nanocrystals with Composition Tunable Energy Gaps and Near Infrared Photoluminescence" United States Patent # 11,556,173; issued 01/31/2023.

49. Rodene, Dylan D.; Eladgham, E.E.; Arachchige, Indika U.; Gupta, Ram B.; "Pure-Phase Cubic $Ni_{1-x}Mo_x$ Alloy Nanoparticles as Low-Cost, Earth Abundant and Durable Electrocatalysts for Water Splitting to Produce Hydrogen" International Application Published Under the Patent Cooperation Treaty (PCT) (19), World Intellectual Property Organization International Bureau (43). Publication Number: WO 2021/046099 Al; Publication Date: March 11, 2021.

50. Mao, Guangzhao; Brock, Stephanie L.; Chen, Dongzhong; Wang, Ruomiao; Arachchige, Indika U., "Particle-Rod Nanostructures and Method of Forming Same by Spin Coating" U.S. Patent # 7,709,054; issued 05/04/2010.

D. Book Chapters

51. Wang, Ruomiao; Arachchige, Indika U.; Brock, Stephanie L.; Mao, Guangzhao, "Nanoparticles as Seeds for Organic Crystallization" in ***ACS Symposium Series No. 996/Nanoparticles: Synthesis, Stabilization, Passivation and Functionalization*** R. Nagarajan and T. A. Hatton, Eds., 2008, pp 358–368***.***

INVITED SEMINARS AT UNIVERSITIES AND INTERNATIONAL MEETINGS

1. Arachchige, Indika U., "Trimetallic Alloy Aerogels: A Class of High efficiency Bifunctional and Durable Electrocatalysts for Alcohol Oxidation Reactions" 2023 Sol-Gel Symposium of China & International Forum, Shandong University, Jinan, China, 10/20/2023-10/23/2023.

2. Arachchige, Indika U. "Synthesis and Structure-Property Elucidation of Group IV Semiconductor Nanostructures and Metal Nanoparticle Superstructures" Key Note Speaker of the Annual Graduate Student Symposium, Department of Chemistry, Wayne State University, Detroit, MI, 10/08/2022.

3. Arachchige, Indika U. "Non-ordered Noble Metal Nanoparticle Superstructures: Aerogels for Enhanced Chemical Sensing and Electrocatalysis" Symposium NM3: Aerogels and Aerogel-Inspired Materials, Materials Research Society Spring Meeting, Phoenix, AZ, 04/17/17-04/21/17.

4. Arachchige, Indika U. "Colloidal Synthesis and Exciton Carrier Dynamics of Group IV Alloy Nanocrystals: An Experimental and Theoretical Study" Department of Chemistry, Old Dominion University, Norfolk, VA, 03/02/2017.

5. Arachchige, Indika U. "Colloidal Synthesis and Exciton Carrier Dynamics of Group IV Alloy Nanocrystals: An Experimental and Theoretical Study" Department of Chemistry, George Washington University, Washington D. C., 09/30/2016.

6. Arachchige, Indika U. "Synthesis and Structure-Property Elucidation of Group IV Semiconductor Nanocrystals and Metal Hollow Particle Superstructures" Department of Chemistry, Georgetown University, Washington D. C., 03/17/2016.

7. Arachchige, Indika U. “Synthesis and Structure-Property Elucidation of Group IV Semiconductor Nanocrystals and Metal Hollow Particle Superstructures” Department of Chemistry, Western Carolina University, Cullowhee, NC, 10/02/2015.

8. Arachchige, Indika U. “Synthesis and Structure-Property Elucidation of Group IV Semiconductor Nanocrystals and Metal Hollow Particle Superstructures” Department of Chemistry, George Mason University, Fairfax, VA, 09/17/2015.

9. Arachchige, Indika U. “Synthesis and Structure-Property Elucidation of Group IV Semiconductor Nanocrystals and Metal Hollow Particle Superstructures” Department of Chemistry, James Madison University, Harrisonburg, VA, 09/10/2015.

10. Arachchige, Indika U. “Synthesis and Structure-Property Elucidation of Group IV Semiconductor Nanocrystals and Metal Hollow Particle Superstructures” Department of Physics, Virginia Commonwealth University, Richmond, VA, 04/10/2015.

11. Arachchige, Indika U. “Synthesis and Structure-Property Elucidation of Group IV Semiconductor Nanocrystals and Metal Hollow Particle Superstructures” Department of Chemistry, University of Mary Washington, Fredericksburg, VA, 03/27/2015.

12. Arachchige, Indika U. “Synthesis and Structure-Property Elucidation of Group IV Semiconductor Nanocrystals and Metal Hollow Particle Superstructures” Department of Chemistry, Duquesne University, Pittsburgh, PA, 03/20/2015.

CONTRIBUTED PAPERS AND PRESENTATIONS

A. Contributed Presentations at National and Regional Meetings (Presenter underlined and undergraduate co-authors are bold)

1. Spera, Drew; Pate, David; Spence, Griffin C.; Villot, C.; Lao, Ka U.; Özgür, Ümit; Arachchige, Indika U.* “Colloidal Synthesis, Energy Gap Tuning and Carrier Dynamics of Ge-Si-Sn Nanoalloys with Visible to Near IR Photoluminescence” Spring 2023 Materials Research Society Meeting, San Francisco, CA, 04/26/23, virtual oral.

2. Spera, Drew; Pate, David; Spence, Griffin C.; Villot, C.; Lao, Ka U.; Özgür, Ümit; Arachchige, Indika U.* “Colloidal Synthesis, Energy Gap Tuning and Carrier Dynamics of Ge-Si-Sn Nanoalloys with Visible to Near IR Photoluminescence” Spring 2023 American Chemical Society National Meeting & Exposition, Indianapolis, IN, 03/26/23-03/31/23, in-person oral.

3. Spence, Griffin; Barbieri, Rachel; Arachchige, Indika U.* “Solution-processed Si-Ge-Sn and Ge-Sn Nanoalloys and Thin Films with Size and Composition-Tunable Optical Properties and High Electrical Conductivity” Spring 2022 American Chemical Society National Meeting & Exposition, San Diego, CA, 03/20/22-03/24/22, virtual oral.

4. Eladgham, Ebtesam; Barbieri, Rachel; Spera, Drew; Arachchige, Indika U.* “Si-Ge-Sn Alloy Quantum Dots with Size and Composition Tunable Visible to Near IR Optical Properties” Spring 2020 American Chemical Society National Meeting & Exposition, Philadelphia, PA, United States, March 22-26, 2020, INOR-1201. **DOI:** https://doi.org/10.1021/scimeetings.0c02759

5. Eladgham, Ebtesam H.; Nakagawara, Tanner A.; Demchenko, Denis O.; Ozgur, Ümit; Arachchige, Indika U.* “Colloidal Synthesis, Energy Gap Tuning, and Carrier Dynamics of Ge-Si-Sn Alloy Quantum Dots with Visible to Near IR Photoluminescence” 256th American Chemical Society National Meeting & Exposition, Boston, MA, 08/19/18-08/23/18, INOR-585,in person oral.

6. “Nanostructured Au/Ag/Pd Alloy Aerogels as High Efficiency Alcohol Oxidation Electrocatalysts” Nahar, Lamia; Farghaly, Ahmed; Esteves, Richard; Arachchige, Indika U.* 254th American Chemical Society National Meeting & Exposition, Washington, DC, 08/20/17-08/24/17, oral.

7. Nahar, Lamia; Gao, Xiaonan; Arachchige, Indika U.* “Hierarchically Porous, Highly Conducting, Au/Pd Alloy Aerogels as High Efficiency Alcohol Oxidation Electrocatalysts” 252nd American Chemical Society National Meeting & Exposition, Philadelphia, PA, 08/21/16–08/25/16, oral.

8. Gao, Xiaonan; Nahar, Lamia; Arachchige, Indika U.* “Porous Conducting Superstructures of Metal Colloids: Noble Metal Aerogels” 250th American Chemical Society National Meeting & Exposition, Boston, MA, 08/16/15-08/20/15, in person oral.

9. **Luong, Thi T. H.;** Gao, Xiaonan; Ranmohotti, Kulugammana G.; Arachchige, Indika U.* “Non-Ordered Metal Hollow Particle Superstructures: Metal Aerogels” 65th Southeast Regional Meeting of the American Chemical Society, Atlanta, GA, 11/13/13–11/16/13, in person oral.

10. Gao, Xiaonan; Kulugammana, Ranmohotti G. S.; Arachchige, Indika U.* “Sol-Gel Methods for the Assembly of Hollow Metallic Spheres into Metal Aerogel Frameworks” 64th Southeast Regional Meeting of the American Chemical Society, Raleigh, NC, 11/14/12–11/17/12, in person poster.

11. Arachchige, Indika U.; Brumbach, Michael; Martinez;* Jennifer; Ivanov, Sergei “New Synthetic Routes for the Preparation of Fluorescent Metal Nanoclusters” 63rd Southeast Regional Meeting of the American Chemical Society, Richmond, VA, 10/26/11–10/29/11, in person oral.

B. Co-Authored Contributed Presentations as the Corresponding Author (Presenter underlined and undergraduate co-authors are bold)

12. Spence, Griffin; Pate, David; Ozgur, Ümit; Arachchige, Indika U. “Exploring the solid-state optical characteristics of size-tunable silicon nanocrystals via high temperature synthesis” Fall 2023 American Chemical Society National Meeting & Exposition, San Francisco, CA, 08/13/2023-08/17/2023, virtual poster.

13. Graves, Lisa; Sarkar, Rajib; Lao, Ka Un; Arachchige, Indika U. “Improving the Electrocatalytic Efficiency of Ni_2P Nanoparticles for the Hydrogen Evolution Reaction through Zinc Doping” Fall 2023 American Chemical Society National Meeting & Exposition, San Francisco, CA, 08/13/2023-08/17/2023, virtual poster.

14. Graves, Lisa; Sarkar, Rajib; Lao, Ka Un; Arachchige, Indika U. “Exploring the Efficiency of Zinc-Doped Ni_5P_4 Nanoparticles as Electrocatalysts for the Hydrogen Evolution Reaction” Fall 2023 American Chemical Society National Meeting & Exposition, San Francisco, CA, 08/13/2023-08/17/2023, virtual poster.

15. Baker, Jordon S.; Wang, Danyang; Lao, Ka Un; Indika Arachchige U. “Comparison of the Activity of Binary and Ternary Fe_2P and $Fe_{2-x}Mo_xP$ Electrocatalysts for the Hydrogen Evolution Reaction” Fall 2023 American Chemical Society National Meeting & Exposition, San Francisco, CA, 08/13/23-08/17/23, virtual poster.

16. Baker, Jordon S.; Alam, Md Kawsar; Wang, Danyang; Lao, Ka Un; Arachchige, Indika U. “Comparison of Binary and Ternary Co_2P and $Co_{2-x}Mo_xP$ Transition Metal Phosphide Electrocatalysts for Water Splitting to Produce Sustainable Hydrogen Fuel” Fall 2023 American Chemical Society National Meeting & Exposition, San Francisco, CA, 08/13/23-08/17/23, virtual poster.

17. Graves, Lisa; Sarkar, Rajib; Lao, Ka Un; Arachchige, Indika U. “Improving the Electrocatalytic Efficiency of Ni_5P_4 and Ni_2P Nanocrystals for the Hydrogen Evolution Reaction through Zinc Doping” Virginia Clean Energy and Catalysis Club (VA CECC) 2023 Summit, Richmond, VA, 08/07/2023, in-person poster.

18. Baker, Jordon S.; Wang, Danyang; Lao, Ka Un; Indika Arachchige U. “A Comparison of the Activity of Binary and Ternary Fe_2P and $Fe_{2-x}Mo_xP$ Electrocatalysts for the Hydrogen Evolution Reaction” Virginia Clean Energy and Catalysis Club (VA CECC) 2023 Summit, Richmond, VA, 08/07/2023, in-person poster.

19. Sarkar, Rajib; Graves, Lisa; Lao, Ka Un; Arachchige, Indika U. “Colloidal Synthesis of Heteroatom Doped Nickel Phosphide Nanocrystals for Electrocatalytic Water Splitting Reactions" Virginia Clean Energy and Catalysis Club (VA CECC) 2023 Summit, Richmond, VA, 08/07/2023, in-person poster.

20. Spera, Drew; Arachchige, Indika U.* “Synthesis and Characterization of Colloidal Ge-Si-Sn Alloy Nanocrystals with Composition Tunable Visible to Near IR Photoluminescence” Spring 2023 American Chemical Society National Meeting & Exposition, Indianapolis, IN, 03/26/23-03/31/23, in-person poster.

21. Spence, Griffin; Arachchige, Indika U.* “Solid State Synthesis of $Si_{1-x}Ge_x$ Nanocrystals Exhibiting Energy Gap Tunability via Ge (II) Halide Precursor” Spring 2023 American Chemical Society National Meeting & Exposition, Indianapolis, IN, 03/26/23-03/31/23, in-person poster.

22. Sarkar, Rajib; Graves, Lisa; Francisco, Ballesteros; Lao, Ka U.; Arachchige, Indika U.* “Colloidal Synthesis of Crystalline Zn-doped Ni_5P_4 Nanoparticles for Electrocatalytic Hydrogen Evolution Reaction” Spring 2023 American Chemical Society National Meeting & Exposition, Indianapolis, IN, 03/26/23-03/31/23, in-person poster.

23. Spence, Griffin; Barbieri, Rachel, Arachchige, Indika U.* "Influence of In-situ Tin Catalyst on Size and Crystallinity of Silicon Nanocrystals Produced via High Temperature Synthesis" Fall 2022 American Chemical Society National Meeting & Exposition, Chicago, IL, 08/21/22-08/25/22, in-person oral.

24. Spence, Griffin; Barbieri, Rachel, Arachchige, Indika U.* "High Temperature Solid State Synthesis of Silicon Nanocrystals with Size Tunability via In-situ Tin Catalyst" Fall 2022 American Chemical Society National Meeting & Exposition, Chicago, IL, 08/21/22-08/25/22, in-person poster.

25. Sarkar, Rajib; Farghaly, Ahmed, A., Arachchige, Indika U.* "Oxidation Induced Self-Assembly of Au/Ag/Pt Alloy Nanoparticles into Highly Porous and Conducting Aerogels for Alcohols Electro-Oxidation" Fall 2022 American Chemical Society National Meeting & Exposition, Chicago, IL, 08/21/22- 08/25/22, in-person oral.

26. Sarkar, Rajib; Arachchige, Indika U.* "Oxidative Sol-Gel Assembly of Ag/Pt/Pd Alloy Nanoparticles into Electrocatalytic Active Aerogel Superstructures for the Alcohol Oxidation Reaction." Fall 2022 American Chemical Society National Meeting & Exposition, Chicago, IL, 08/21/22- 08/25/22, in-person oral.

27. **Taylor, Jessie. R.;** Sarkar, Rajib; Arachchige, Indika U.* “Ag/Pt/Pd Alloy Nanoparticles and Aerogels as High-Efficiency Alcohol Oxidation Electrocatalysts” 2022 AAAS Annual Meeting, 02/17/22-02/22/22, E-poster.

28. Barbieri, Rachel; Ding, Kai; Özgür, Ümit; Arachchige, Indika U.* "Self-Assembled $Ge_{1-x}Sn_x$ Alloy Nanocrystal Thin Films Exhibiting Tunable Energy Gaps and High Electrical Conductivity" Spring 2022 American Chemical Society National Meeting & Exposition, San Diego, CA, 03/20/22-03/24/22, virtual oral.

29. Barbieri, Rachel; Ding, Kai; Özgür, Ümit; Arachchige, Indika U.* "Expanding Chemical Versatility of $Ge_{1-x}Sn_x$ Nanocrystals for the Fabrication of Thin Films with High Electrical Conductivity and Tunable Energy Gaps" Spring 2022 American Chemical Society National Meeting & Exposition, San Diego, CA, 03/20/22-03/24/22, virtual poster.

30. Spera, Drew Z.; Arachchige. Indika U.* "Synthesis and Characterization of $Ge_{1-x}Sn_x@SiO_2$ Core-Shell Nanocrystals" Spring 2022 American Chemical Society National Meeting & Exposition, San Diego, CA, 03/20/22-03/24/22, virtual poster.

31. Spera, Drew Z.; Arachchige. Indika U.* "Surface Passivation of $Ge_{1-x}Sn_x$ Nanocrystals by Silica Coating" Spring 2022 American Chemical Society National Meeting & Exposition, San Diego, CA, 03/20/22-03/24/22, virtual poster.

32. Sarkar, Rajib; Farghaly, Ahmed. A.; Arachchige, Indika U.* **"**Sol-Gel Assembly of Ag/Pt/Au Alloy Nanoparticles into High Surface Area, Mesoporous, and Conducting Aerogels for Alcohol Oxidation Reactions." Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlanta, GA, 03/05/22-03/09/22, virtual poster.

33. Barbieri, Rachel; Ding, Kai; Özgür, Ümit; Arachchige, Indika U.* "Electrically Conductive $Ge_{1-x}Sn_x$ Alloy Nanocrystal Thin Films with Tunable Energy Gaps" Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlanta, GA, 03/05/22-03/09/22, virtual poster.

34. Barbieri, Rachel; Özgür, Ümit; Arachchige, Indika U.* "Self-assembled Ge_xSn_{1-x} Quantum Dot Thin Films for Visible to Near IR Optoelectronic Studies" Spring 2020 American Chemical Society National Meeting & Exposition, Philadelphia, PA, 03/22/20-03/26/20, virtual poster, INOR-0357.

35. Eladgham, Ebtesam; Rodene, Dylan; Gupta, Ram B.; Arachchige, Indika U.* "Colloidal Synthesis of Efficient Binary Ni-Mo Nanoalloys Catalysts and Their Phosphides Towards Water Splitting" American Chemical Society National Meeting & Exposition, Philadelphia, PA, United States, 03/2220-03/26/20, virtual poster, INOR-1040. **DOI:** https://doi.org/10.1021/scimeetings.0c04581

36. Eladgham, Ebtesam; Rodene, Dylan; Gupta, Ram B.; Arachchige, Indika U.* "Efficiency of Ni-Mo-P Nanoalloys Catalysts with Various Compositions and Crystal Structures Towards Hydrogen Evolution Reactions." American Chemical Society National Meeting & Exposition, Philadelphia, PA, United States, March 22-26, 2020, virtual poster, COLL-0368.
DOI: https://doi.org/10.1021/scimeetings.0c04594

37. Rodene, Dylan D.; Eladgham, Ebtesam H.; Arachchige; Indika U.;* Gupta, Ram B. "Crystal Phase Dependence on HER Water Splitting Performance of Earth-Abundant Electrocatalysts," 235th Electrochemical Society Meeting, Dallas, TX, 05/26/19- 05/31/19, in person oral.

38. Barbieri, Rachel; Özgür, Ümit; Arachchige; Indika U.* "Self-Assembled $Ge_{1-x}Sn_x$ Quantum Dot Thin Films for Visible to Near IR Optoelectronic Studies" International Symposium on Clusters and Nanomaterials, Richmond, VA, 11/3/19-11/7/19, in person poster.

39. Spera, Drew Z.; Arachchige; Indika U.* "Synthesis of $Ge_{0.92}Sn_{0.08}/SiO_2$ Core-Shell Nanocrystals" International Symposium on Clusters and Nanomaterials, Richmond, VA, 11/3/2019-11/7/2019, in person poster.

40. Eladgham, Ebtesam H.; Rodene, Dylan; Gupta, Ram B.; Arachchige; Indika U.* "Colloidal Synthesis of Efficient Binary Ni-Mo Nanoalloys Catalysts and their Phosphides for Electrochemical Hydrogen Evolution Reactions" International Symposium on Clusters and Nanomaterials, Richmond, VA, 11/03/19-11/07/19, in person poster.

41. Sarkar, R; Arachchige; Indika U.* "Sol-Gel Assembly of Au/Ag/Pt Alloy Nanoparticles into Aerogel Superstructures for Application in Fuel Cells." International Symposium on Clusters and Nanomaterials, Richmond, VA, 11/03/19-11/07/19, poster.

42. Eladgham, Ebtesam; Nakagawara, Tanner A.; Ozgur, Ümit; Demchenko, Denis O.; Arachchige, Indika U.* "Colloidal Synthesis of Highly Luminescent Lithium Silicate Nanoparticles and Their Chemical Transformation into Different Crystal Structures" 256th American Chemical Society National Meeting & Exposition, Boston, MA, 08/19/20/18-08/23/18, INOR-472, in person poster.

43. **Vaghjiani, Nilan**; Nahar, Lamia; Arachchige, Indika U.* "Ag and Au/Ag Nanostructures as High Efficiency Surface Enhance Raman Scattering Substrates for Detection of Biomolecules" ACS Virginia Section Meeting: Undergraduate Poster Session, Charlottesville, VA, 04/14/17, poster.

44. Esteves, Richard J.; Hafiz, Shopan; Demchenko, Denis O.; Özgür, Ümit; Arachchige, Indika U.* "Ultra-Small $Ge_{1-x}Sn_x$ Quantum Dots with Orange-Red Photoluminescence" 252th American Chemical Society National Meeting & Exposition, Philadelphia, PA, 08/21/16–08/25/16, oral.

45. Tallapally, Venkatesham; Esteves, Richard J.; Arachchige, Indika U.* "Size, Shape, and Phase Control Synthesis of Crystalline and Amorphous Tin Phosphide Nanoparticles" 252nd American Chemical Society National Meeting & Exposition, Philadelphia, PA, 08/21/16–08/25/16, oral.

46. Esteves, Richard J.; Hafiz, Shopan; Demchenko, Denis O.; Özgür, Ümit; Arachchige, Indika U.* "Exciton Carrier Dynamics of Luminescent $Ge_{1-x}Sn_x$ Quantum Dots" 252nd American Chemical Society National Meeting & Exposition, Philadelphia, PA, 08/21/16–08/25/16, poster.

47. Naha, Lamia; Gao, Xiaonan; Esteves, Richard J.; Arachchige; Indika U.* "Sol-gel Assembly of Au/Ag Alloy Nanoparticles into Aerogels for Application in Surface Enhanced Raman Scattering" 252nd American Chemical Society National Meeting & Exposition, Philadelphia, PA, 08/21/16–08/25/16, in person poster.

48. Tallapally, Venkatesham; Esteves, Richard J.; Arachchige, Indika U.* "Tunable Size and Shape Controlled Synthesis of Crystalline and Amorphous Tin Phosphide Nanoparticles" 252nd American Chemical Society National Meeting & Exposition, Philadelphia, PA, 08/21/16-08/25/16, poster.

49. Nahar; Lamia, Farghaly; Ahmed A., Arachchige; Indika U.* "Metal Aerogels as High Efficiency Alcohol Oxidation Electrocatalysts" 252nd American Chemical Society National Meeting & Exposition, Philadelphia, PA, 08/21/16–08/25/16, in person poster.

50. **Nowaczyk, Jordan N.**; Nahar, Lamia; Arachchige, Indika U.***** "Synthesis and Characterization of Ag/Pd/Au Nanoparticle and Hollow Nanoparticle Aerogels" American Chemical Society Virginia Section Meeting: Undergraduate Poster Session, Charlottesville, VA, 04/15/16, in person poster.

51. Esteves, Richard. J.; Ho, Minh Q.; Arachchige, Indika, U.***** "Composition Tunable Absorption and Emission Properties of $Ge_{1-x}Sn_x$ Alloy Nanocrystals" International Symposium on Clusters and Nanomaterials, Richmond, VA, 10/26/15–10/29/15, poster.

52. Ho, Minh; Esteves, Richard J.; Arachchige, Indika U.***** "Colloidal Synthesis and Characterization of Size Tunable, Luminescent Zn_3P_2 Nanocrystals" 250th American Chemical Society National Meeting & Exposition, Boston, MA, 08/16/15–08/20/15, oral.

53. Esteves, Richard J.; Arachchige, Indika U.***** "Semiconducting Group IV Quantum Dots for Tunable Bandgaps" 250th American Chemical Society National Meeting & Exposition, Boston, MA, 08/16/15–08/20/15, oral.

54. Gao, Xiaonan; Arachchige, Indika U.***** "Sol-Gel Methods for the Assembly of Noble Metal Nanoparticles into Metallic Aerogels" 250th American Chemical Society National Meeting & Exposition, Boston, MA, 08/16/15–08/20/15, oral.

55. Nahar, Lamia; Arachchige, Indika U.***** "Sol-Gel Method: An Advanced Technique to Obtain 3-D Superstructures of Metal-Semiconductor Hybrid Nanoparticles." 250th American Chemical Society National Meeting & Exposition, Boston, MA, 08/16/15–08/20/15, oral.

56. Kulugammana, Ranmohotti G. S.; Gao, Xiaonan; Arachchige, Indika U.***** "Salt-Mediated Assembly of Bimetallic Nanoshells into Monolithic Aerogel Frameworks" 46th Central Regional Meeting of the American Chemical Society, Grand Rapids, MI, 05/27/15–05/30/15, poster.

57. **Thomas, Patricia**; Esteves, Richard J.; Arachchige, Indika U.***** "Developing Synthetic Controls for Monodisperse $Ge_{1-x}Sn_x$ Alloy Nanocrystals" Annual Biomedical Research Conference for Minority Students, 11/12/14–11/15/14, San Antonio, TX, oral.

58. Esteves, Richard J.; Arachchige, Indika U.***** "Bandgap Engineering of Germanium Nanoparticles Through Tin Alloying and Quantum Confinement Effects" 65th Southeast Regional Meeting of the American Chemical Society, Atlanta, GA, 11/13/13–11/16/13, oral.

59. Gao, Xiaonan; Arachchige, Indika U.***** "Sol-Gel Assembly of Silver Nanoshells into Aerogel Frameworks" 65th Southeast Regional Meeting of the American Chemical Society, Atlanta, GA, 11/13/13–11/16/13, oral.

60. **Luong, Thi T. H.**; Gao, Xiaonan; Arachchige, Indika U.***** "Sol-Gel Assembly of Ag Hollow Particles into Ag Aerogels" American Chemical Society Virginia Section Meeting: Undergraduate Poster Session, Charlottesville, VA, 04/19/13, poster.

61. Kulugammana, Ranmohotti G. S.; Gao, Xiaonan; Arachchige, Indika U.***** "Self-Supported Assembly of Hollow Metallic Spheres into Aerogel Frameworks" 245th ACS National Meeting, New Orleans, LA, 04/07/13-04/11/13, oral.

62. Esteves, Richard. J.; Arachchige, Indika, U.***** "Composition Tunable Absorption and Emission Properties of $Ge_{1-x}Sn_x$ Alloy Nanocrystals" 64th American Chemical Society Southeastern Regional Meeting, Raleigh, NC, 11/14/12-11/17/12, poster.

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Chemical Society (ACS)
- Materials Research Society (MRS)
- Phi Lambda Upsilon (PLU)
- Sigma Xi, The Scientific Research Honor Society

DEPARTMENT, COLLEGE, AND COMMUNITY SERVICE

A. Internal Service

A1. Department of Chemistry

- Principal Investigator, NSF-Research Experiences for Undergraduates (REU) program, 2019–22

  The objective of this program is to recruit undergraduate students from PUIs and HBCUs and train them in research techniques (practices) with career preparation and scientific awareness activities (perspectives) in chemistry in collaboration with VCU chemistry faculty and industrial (Pfizer/GSK pharmaceuticals/Haleon Inc.) scientists. This program ran for 10.5 weeks over the summer and supported eight undergraduate students yearly (24 total).
- Chair of the Graduate Recruitment and Admissions Committee, 2017–present
- Member of the Graduate Recruitment and Admissions Committee, 2011–16
- Designated approver, VCU Accelerated BS/MS Program, 2022–present
- Member of the Physical Chemistry Faculty Search Committee, 2018/2019
- Member of the third year review committee, Dr. Ka Un Lao (spring 2022)
- Member of the third year review committee, Dr. Sherif Moussa (spring 2018)
- Member of the third year (spring 2019) and full tenure (fall 2022) review committees, Dr. Dhakal
- Member of the High School Chemistry Committee, 2015–2017
- Member of the Nanoscience Faculty Search Committee, 2014/2015
- Member of the Chemistry Department Safety Committee, 2012/2013
- Recording of Faculty Meeting Minutes, 2011–2013 continuously
- Current member of eight doctoral dissertation committees in the chemistry department
- Past member of 37 doctoral and master's thesis committees, 2012–23
- Outside examiner on several dissertation committees (Engineering and Physics)

A2. College of Humanities and Sciences (CHS) and the University

- Member of the CHS Research Space Committee, 2022
- Member of the CHS Faculty Advisory Committee on Scholarly Leave, 2022
- Member of the CHS Faculty Council, 2016-2019 continuously
- Member of the promotion and tenure committee, Dr. Patrick H. Woodworth (Physics)
- Member of the promotion and tenure committee, Dr. Yelena Pork (Physics)
- Alternate member of the VCU Faculty Senate, 2016/2017
- Reviewer, CHS Catalyst and Seed proposal panel, multiple years
- Reviewer, Undergraduate Research Opportunities Program (UROP), 2015/16
- Reviewer, CHS-Baldacci Student Experiential Learning Endowed Fund, 2017-2020, spring 2023
- Reviewer, Dean's Scholarship Awards of the College of Humanities and Sciences, 2014/15
- Reviewer, VCU Presidential Research Quest Fund (PeRQ), multiple years
- Reviewer, VCU Breakthroughs Fund, 2021/22
- Reviewer, VCU Institute for Sustainable Energy and Environment (ISEE), 2021/22

B. External Service

B1. Review of Proposals for Public and Private Agencies

- Panel Reviewer, NSF–Division of Materials Research (DMR): Electronic and Photonic Materials (EPM) and Solid State and Materials Chemistry (SSMC) programs, multiple years.
- Panel Reviewer, NSF–Division of Chemistry (CHE): Research Experiences for Undergraduate (REU) and Macromolecular, Supramolecular and Nanochemistry (MSN), and Chemical Catalysis (CAT) programs, multiple years.

- Ad-hoc Reviewer, NSF–Solid State and Materials Chemistry (SSMC) and Metals and Metallic Nanostructures (MMN) programs, multiple years.
- Ad-hoc Reviewer, NSF–Centers of Research Excellence in Science & Technology (CREST), Research Infrastructure for Science and Engineering (RISE), Broadening Participation Research (BPR) in STEM, and Excellence in Research (EiR) programs, multiple years.
- Ad-hoc Reviewer, European Research Council (ERC) Synthetic & Materials Chemistry program and ERC Consolidator Grant 2022 program, multiple years.
- Ad-hoc Reviewer, Swiss National Science Foundation (SNSF): Division of Mathematics, Physical and Engineering Sciences, 2018–2020.
- Ad-hoc Reviewer, American Chemical Society–Petroleum Research Fund, multiple years.
- Ad-hoc Reviewer, VA Commonwealth Research Commercialization Fund (CRCF).
- Ad-hoc Reviewer, NASA and PRESTIGE Postdoctoral Research programs.
- Ad-hoc Reviewer, Stanford Synchrotron Radiation Light Source (SSRL) user proposals.

B2. Review of Manuscripts for (10–15 papers per year)

- Nature Publishing Group, American Chemical Society, Royal Society of Chemistry, John Wiley & Sons, Elsevier, and Springer journals.

B3. Editorial Board Memberships

- Associate Editor, Frontiers in Chemistry journal.
- Member of the editorial board of JSM Nanotechnology and Nanomedicine.
- Member of the editorial board of International Journal of Nano-studies & Technology (IJNST).

B4. Community Service and Outreach

- Founder and Organizer of Summer Research Experience for Educators and Students (SREES) program. The objective of this eight weeks long summer research program is to educate economically disadvantaged high school students and teachers on scientific research by actively participating them in nanoscience research projects at VCU Chemistry laboratories. To date, two high school teachers and five high school students were hosted through this initiative in Dr. Arachchige's lab (2013–2015).
- Undergraduate Student Mentor, NSF–REU program. Six REU students were hosted in the Arachchige Lab in 2012–2014 and 2019–2022.
- Undergraduate Student Mentor, VCU-China Student Exchange program. Two student visitors were hosted in the Arachchige lab in summer 2013–2014.
- Participating faculty member of high school student visits to VCU Chemistry research labs. Facilitated a tour of ~10-15 students from Piedmont Virginia Community College and Maggie Walker Governor's School, followed by a discussion of on-going projects (2019 and 2023).
- High School Student mentor, ACS–SEED project. Two ACS-SEED supported high school students were hosted in the Arachchige lab in summer 2017 and 2023.

B5. Member of the Organizing Committee for

- Co-organizer of the STEM Research Day at Martin Luther King Jr. Middle School, 03/25/14.
- Judge for Virginia Junior Academy of Science Symposium, Richmond, VA, 05/15/14.
- Judge for Chesapeake Bay Governor's School Science Symposium, 03/15/14.

B6. Presider at National and Regional American Chemical Society (ACS) Meetings

- Nanoscience Session Chair at Spring 2022 ACS National Meeting (San Diego, CA)
- Nanoscience Synthesis Session Chair at 252nd ACS National Meeting (Philadelphia, PA)
- Colloids and Surface Chemistry Session Chair at 250th ACS National Meeting (Boston, MA)
- Nanoscience Synthesis Session Chair at 245th ACS National Meeting (New Orleans, LA)
- Chemistry of Materials Session Chair at 65th American Chemical Society Southeastern Regional Meeting (Atlanta, GA).