

ARUNA KUMARASIRI

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EDUCATION

University of Victoria, Victoria, British Columbia

Doctor of Philosophy, Chemistry

2021–present

University of Moratuwa, Moratuwa, Sri Lanka

Bachelor of Science (Dean's Honor List), Materials Science and Engineering

2015–2020

EXPERIENCE

University of Victoria, Victoria, BC

Graduate Research Assistant

SEP 2021–present

- Design and build custom instrumentation for vibrational spectroscopy, integrating commercial components with tailored optical configurations; Implement experiment control and automation using Python and LabVIEW.
- Applied vibrational spectroscopy to characterize interfacial electronic structure independent of molecular orientation, delivering actionable insights for surface chemistry applications.
- Developed a novel vibrational spectroscopy calibration method to quantify interfacial polarizability changes, achieving accurate results without conventional complex procedures.

Flintec Transducers, Inc., Koggala, Sri Lanka

Research and Development Engineer

MAR 2020–AUG 2021

- Recruited based on the performance of the final-year project (University of Moratuwa) to implement a novel load cell product line, translating laboratory research into scalable manufacturing processes.
- Investigated hydrogen evolution during nickel electrodeposition on Ni20Cr alloys, optimizing microstructure to enhance the reliability and fatigue resistance of strain gauges in load cells, validated through industrial-scale fatigue and microhardness tests.
- Modeled and optimized electrodeposition baths using COMSOL Multiphysics® to develop a novel electroplating system, achieving a 20% improvement in solderability for Ni20Cr-based strain gages.

University of Moratuwa, Moratuwa, Sri Lanka

Undergraduate Research Assistant

AUG 2015–FEB 2020

- Developed a surface treatment and electroplating protocol for nichrome alloys using $ZnCl_2/HCl$ and a two-step nickel electroplating process to improve solderability.
- Designed an experimental setup to measure contact angles of solder droplets, quantifying wettability improvements: >50% reduction by chemical treatment and >60% reduction via nickel electroplating.
- Optimized electroplating parameters (pH, thickness, current density) for a lead-free solder (SN100C), achieving improved adhesion and reliable industrial-scale soldering performance.

Straintec Pvt. Ltd., Koggala, Sri Lanka

Research and Development Engineering Trainee

AUG 2018–DEC 2018

- Developed an image processing software in Visual Basic.NET® 16.0 to measure the contact angles of the solder droplets at the nichrome-solder alloy interface, using polynomial and ellipse fitting algorithms (99% accuracy); standardized in lab operations.
- Designed an industry-ready method to calculate the resistance temperature coefficient (RTC) of strain gauges with ± 1 ppm precision, allowing real-time data acquisition through Keysight BenchVue software.

SELECTED
PUBLICATIONS

8. **Kumarasiri, A.**, Yang, P., & Dennis K. Hore (2025). Sum frequency dual null angle approach and its use in surface hyperpolarizability ratio measurements. *The Journal of chemical physics* (163, 084715)
7. Yang, P., **Kumarasiri, A.**, & Dennis K. Hore (2024). Surface populations as a model for the distance dependence of the interfacial refractive index. *The Journal of chemical physics* (161, 054703)
6. **Kumarasiri, A.**, Yang, P., & Dennis K. Hore (2023). Second-Order Nonlinear Optics as an Orientation-Independent Probe of Molecular Environments at Interfaces. *The Journal of Physical Chemistry Letters* (14.19 : 4449-4453)
5. **Kumarasiri, A.**, Herath, H. S., Amarasinghe, D. A. S., & Attygalle, D. (2021). Effects of Current Density on the Solder Wettability of Nickel Electrodeposited Ni20Cr Alloy. *2021 Moratuwa Engineering Research Conference, IEEE* (pp. 160–164)
4. **Kumarasiri, A.**, Amarasinghe, D. A. S., & Attygalle, D. (2020). Surface Wettability Analysis of Nichrome Alloy Based on the Measurements of Sessile Droplet Contact Angles. *2020 Moratuwa Engineering Research Conference, IEEE* (pp. 160–164)
3. **Kumarasiri, A.**, Amarasinghe, D.A.S., & Attygalle, D. (2020). Development of a method to measure contact angles of sessile droplets to analyze and enhance the surface wettability of nichrome [Abstract]. *Materials Engineering Symposium on Innovations for Industry* (p. 20)
2. **Kumarasiri, A.**, Attygalle, D. and Amarasinghe, D. A. S. (2019). A contact angle based approach to improve the lead-free solder compatibility on nichrome alloy [Abstract]. *4th International Research Symposium on Pure and Applied Sciences* (p144)
1. **Kumarasiri, A.**, Attygalle, D., & Amarasinghe, D. A. S. (2019). Lead Free Solder Compatibility Improvement on Nichrome Alloy Through Contact Angle Modification. *2019 Moratuwa Engineering Research Conference, IEEE* (pp. 340–344)

CONFERENCE
PRESENTATIONS

6. “Fundamental clues about interfacial environments can be obtained independent of the orientational distribution of molecules.” *12th International Conference on Advanced Vibrational Spectroscopy*. 30 AUG. 2023. Kraków, Poland. [O]
5. “Electronic Structure of para-Cyanophenol at the Air-Aqueous Interface from Vibrational Sum Frequency Generation Spectroscopy.” In *12th International Conference on Advanced Vibrational Spectroscopy*. 29 AUG. 2023. Kraków, Poland. [P]
4. “Second-Order Nonlinear Optics as an Orientation-Independent Probe of Molecular Environments at Interfaces.” *Canadian Chemistry Conference and Exhibition*. 6 JUNE. 2023. Vancouver BC, Canada. [O]
3. “Development of an Electrodeposition Method to Enhance the Solderability of Lead-Free Solder on Nichrome Alloy.” In *5th International Research Symposium on Pure and Applied Sciences, University of Kelaniya*. 26 NOV. 2020. Kelaniya, Sri Lanka. [O]
2. “Development of a Reliable Method to Quantify the Solderability of Lead-Free Solder on Nichrome Alloy.” *Annual Research Symposium of the Young Scientist Forum*. 13 NOV. 2020. Colombo, Sri Lanka. [O]
1. “A Contact Angle Based Approach to Evaluate the Solderability of Nichrome Alloy.” *Annual Sessions, Institution of Engineers of Sri Lanka*. 19 OCT. 2019. Colombo, Sri Lanka. [O]

[O] = oral presentation, [P] = poster presentation

COMMUNITY &
LEADERSHIP

Treasurer, Optica & SPIE , UVic student chapters	DECEMBER 2024 - present
Education Volunteer, CSC 2023 , Vancouver, BC	JUNE 2023
Education Tech Blogger, (proactivegrad.com & econblend.com)	APRIL 2020 - present

ADDITIONAL
INFORMATION

English (full professional proficiency, IELTS 8.0), SOLIDWORKS, WordPress (theme creation and customization, website development, SEO), Minitab, R, MATLAB, Python (NumPy, Pandas, SciPy), COMSOL Multiphysics, LabVIEW, OriginPro, Blogging at [arunak.net](#)

(Last updated on August 27, 2025)