KASSAPA GAMAGEDARA

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Potsdam, NY, USA

Career objective

Excited to apply my advanced academic training, research experience, and problem-solving abilities to contribute to process optimization, innovation, and efficiency in semiconductor manufacturing.

Education

2021-present **Clarkson University,** Potsdam, NY, USA
Ph. D. in Physics
Current field of research studies: Tribo-electrochemistry, Chemical mechanical planarization (CMP), optimizing CMP slurries, material removal, galvanic corrosion, material selectivity.

2019-2021 **Clarkson University,** Potsdam, NY, USA
M. Sc. in Physics
GPA: 3.52 out of 4.00

2016-2018 **Postgraduate Institute of Science (PGIS)**, University of Peradeniya, Sri Lanka
M. Sc. in Physics: Physics of Materials
Research project: Development of a flexible polymeric composite possessing magnetic and electrical conducting properties.
GPA: 3.50 out of 4.00

2013-2015 **University of Peradeniya**, Peradeniya, Sri Lanka
B.Sc. Physics, Mathematics and Statistics
GPA: 3.04 out of 4.00

Research Experience

2019-present **Expertise:** Used electrochemical methods to optimize CMP slurries for metals/alloys. Experienced in minimizing/evaluating noise in electrical signals during mechanical abrasion. Conducted and analyzed post-CMP cleaning and pulse electrodeposition on Cu wafers.
Instrumentation:

- AMETEK Scientific Instruments Solartron 1287 A
- AMETEK Scientific Instruments Frequency Response Analyzer 1252A
- Princeton Applied Research VersaSTAT 3
- MBRAUN LabStar MB 10 Compact Laboratory glove box
- Atomic force microscopy
- Struers LaboPol – 5 polisher
- 3 electrode tribo-electrochemical cell
- Pine instrument rotating disk electrode device
- Post CMP cleaning on Cu and Co wafers

2016-2018 **Expertise:** This project involved analyzing materials at the nanoscale, recognizing nano-range particles, identifying chemical bonds, detecting and quantifying metals, studying morphology, and measuring sheet resistance to assess electrical properties.
Instrumentation:

- CILAS Nano DS particle size analyzer
- X-ray fluorescence
- SHIMADZU IR Prestige-21Fourier Transform-Infrared spectroscope
- ZEISS Evo LS15 scanning electron microscope
- ZEISS Evo LS15 Energy dispersive analysis X-ray
- VK-PA-25 PV Power Analyzer for four probe resistance measurements

Software skills

2016-present OriginPro® - OriginLab – Illustrations and data analysis
Microsoft office (Excel, Word, PowerPoint)

2019-present CorrWare, Zplot, Zview – AMETEK – Data visualization and analysis (KKT)
Versastudio – VersaSTAT 3 - Data visualization
ZSimpWin – AMETEK – CNLS analysis and electrically equivalent circuit (EEC) fitting

Work Experiences

2022-present **In charge of research lab management** Safety is ensured, equipment and software are maintained, and research projects are coordinated according to guidelines. Budgeting, funding, and financial records are managed, while personnel are supervised and trained in compliance with specific lab protocols.

2019-present **Graduate Teaching Assistant** Department of Physics, Clarkson University, Potsdam, NY, USA
Content: PH131 (Kinematics, Newton's Laws, Work & Energy, Momentum & Impulse, Rotational Motion, Gravitation, Oscillations & Waves), PH132 (Electrostatics, Electric Potential, Capacitance, Electric Circuits, Magnetism, Ampère's Law, Electromagnetic Induction, Maxwell's Equations)

2016-2019 **High School Mathematics Teacher** (Edexcel International GCSE (9-1)) Colombo International School, Kandy, Sri Lanka
Content: Number, Algebra, Geometry, Mensuration, Statistics, Coordinate Geometry, Vectors, Probability, Functions.

Awards and activities

Awarded Outstanding Graduate Student Award at the Clarkson's Celebration & Recognition of Excellence Weekend (CREW) – *Coulter School of Engineering and Applied Sciences - April 2025*

Awarded 1st place for the Best graduate poster for chemistry and electrochemistry, material science - *Clarkson research and project showcase (RAPS) – July 2022*

Treasurer – *Clarkson Cricket Club (08/20 – 08/22) – Clarkson University* – Managed financial records, including budgeting and expense tracking and organized fund-raising events, for the club's activities and events.

Publications

2025 Tribo-Electrochemical Characterization of Brush-Scrubbed Post-CMP Cleaning: Results for Tartrate-Supported Removal of Residual Oxides from Copper Films
Collin M. Reff, Kassapa U. Gamagedara, D. R. Santefort and D. Roy – MDPI, Lubricants 13 (7)

Tribo-Electrochemical Considerations for Assessing Galvanic Corrosion Characteristics of Metals in Chemical Mechanical Planarization.
Kassapa U. Gamagedara and D. Roy – MDPI, Electrochem 6(2)

Tribo-Electrochemical Mechanism of Material Removal Examined for Chemical Mechanical Planarization of Stainless-Steel Using Citrate Buffer as a Complexing Agent.
DR Santefort, KU Gamagedara, D. Roy – MDPI, Materials 18 (2)

2024 Mechanisms of Chemically Promoted Material Removal Examined for Molybdenum and Copper CMP in Weakly Alkaline Citrate-Based Slurries.
K. U. Gamagedara and D. Roy – MDPI, Materials 17 (19)

Experimental Strategies for Studying Tribo-Electrochemical Aspects of Chemical-Mechanical Planarization.
Kassapa Gamagedara and Dipankar Roy – MDPI, Lubricants 12 (2)

2022 Tribo-electroanalytical evaluation of CMP slurries and post-CMP cleaning solutions
David Santefort, Kassapa Gamagedara, and Dipankar Roy - ICPT Conference Proceedings (2022), Portland, OR, USA, September 2022

Presentations

2025 Validation of Impedance Spectra for Chemical Mechanical Planarization Systems using Kramers-Kronig Transform: Results for Stainless-Steel in Citrate Based Polishing Slurries - *Clarkson research and project showcase (RAPS) – April 2025*

2024 Utility of Open Circuit Potential Measurements for Detecting Material Selectivity in Chemical Mechanical Planarization of a Diffusion Barrier and Copper - *26th CAMP International CMP Symposium – Aug 12th, 2024*

Material Removal Mechanisms in Chemical Mechanical Planarization of Stainless Steel: A Case Study of 316/316L in Acidic Slurries using Alumina Abrasives - *Clarkson Physics colloquium – Oct 25th, 2024*

2023 Mechanisms of Material Removal for Molybdenum CMP Examined in the Tribo-Electrochemical Approach using Citrate and Percarbonate as Surface Modifiers - *25th CAMP International CMP Symposium – Aug 7th, 2023*

Tribo-Electrochemical Selectivity of Copper Examined with Respect to Cobalt and Molybdenum for Application in Chemical Mechanical Planarization - *Clarkson Physics colloquium – Dec 8th, 2023*

2022 Measurement of Active Sample Area in Electroanalytical Studies of CMP Reactions Under Polishing Conditions - *Clarkson research and project showcase (RAPS) – July 2022*

Investigation of a Mo/Cu CMP System by Combining Chemical and Mechanical Components of Planarization - *Clarkson Physics colloquium – Dec 2nd, 2022*

2021 Electroanalytical Protocols for Testing CMP Compatibility of Electrodeposited Copper on Cobalt - *Clarkson research and project showcase (RAPS) – July 2021*

Coactive Roles of a Tartrate Based Solution and a PVA Brush in Post CMP Cleaning of Oxide Residues from Copper Films - *Clarkson research and project showcase (RAPS) – July 2021*

Tribo-electrochemical investigation of Mo and Cu for application in CMP - *Clarkson Physics colloquium – Nov 5th, 2021*