Conrad Rizal, PhD

PhD (University of British Columbia, Vancouver, Canada)

D.Eng. (Japan) · Senior Member, IEEE (USA) · Chartered Engineer, IET (UK)

SCIENTIST · ENTREPRENEUR · JOURNAL EDITOR

Magneto-optics · Magnetoplasmonics · SPR / MO-SPR sensors · Nanophotonics · Spintronics · AI-enabled sensing

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PROFESSIONAL PROFILE

Canadian scientist, entrepreneur and journal editor with more than two decades of research across **Nepal, Bangladesh, Qatar, Japan, Canada and the United States**. An internationally recognized contributor to **magneto-optic surface plasmon resonance (MO-SPR)** and **magnetoplasmonic sensing**, he established design rules and sensitivity metrics comparing MO-SPR with conventional SPR and now studies fundamental (Fisher-information) limits of refractive-index sensing. He is **Founder, CEO and Principal Investigator of Seed NanoTech International Inc.**, **CEO of NexPico Inc.**, President of SCBIF, founder-chair of the ICAPMOT conference series, **Associate Editor of *IEEE Access***, and author of the autobiography *A Journey from Myagdi, Nepal to Ontario, Canada*.

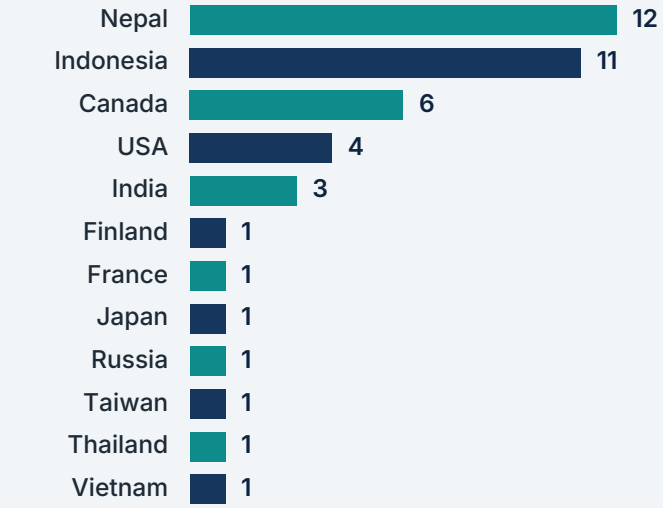
INTERNATIONAL TALKS & GLOBAL ENGAGEMENT

43
international talks and engagements listed in this CV (lectures, keynotes, chairing, delegations, visits, conferences); selected from 50+ invited lectures

12
countries: Nepal, Indonesia, Canada, USA, India, Finland, France, Japan, Russia, Taiwan, Thailand and Vietnam

3
continents: Asia, North America and Europe; full details in the International Talks section

Engagements by country



EDITORIAL & PEER-REVIEW SERVICE

Editorial appointments

Associate Editor — *IEEE Access* (IEEE)

Associate Editor — *Journal of Nanomedicine Research* (MedCrave)

Editorial Board — *Frontiers of Science*; *Journal of Nano Biomedicine*

Guest Editor — special issues

***Photonics* (MDPI)** — "Optical Biosensors: From Fundamental Optics to Diagnostic Applications" (with Dr. Y. K. Prajapati, MNNIT Allahabad); open to June 2027.

Magnetochemistry — "Advanced Plasmonics and Magneto-Optical Technologies" (with Dr. J. R. Mejía-Salazar and Dr. H. Shimizu); closed April 2022.

Magnetochemistry — "Recent Developments in Biomagnetism / Magneto-Biology"; closed February 2021.

Condensed Matter — "Magnetoplasmonics Material and Devices"; closed August 2019 (editorial: *Surface Plasmon Resonance (SPR) to Magneto-Optic SPR*).

Referee

Journal of the Optical Society of America B (Optica); IEEE magnetics journals; IOP Publishing journals including *Journal of Physics D: Applied Physics*; Springer optics and optical-communications titles; MDPI *Electronics*, *Magnetochemistry* and *Photonics*; and other journals in nanophotonics, magnetics, nanomaterials and plasmonics.

KEY FIGURES

97
publication records (SciProfiles); 44 verified items listed in this CV

870+
citations (OpenAlex) · h-index 18 · i10-index 24

50+
invited, keynote & guest lectures; engagements in 12 countries

4
MDPI special issues as Guest Editor; Associate Editor, *IEEE Access*

3
organizations founded or led: Seed NanoTech, NexPico, SCBIF

9
of 10+ competitive research proposals funded (Canada, Japan, USA)

6
countries of study & work: Nepal, Bangladesh, Qatar, Japan, Canada, USA

25+
years of peer-reviewed research (2002 – 2026)

AREAS OF EXPERTISE

Magneto-optics & magnetoplasmonics
TMOKE, MO-SPR, magneto-optic multilayers (Co/Au, Ti/Au/Co/Au), all-dielectric magnetophotonics, magnetometry

Spintronics & thin-film magnetism
GMR/AMR, perpendicular magnetic anisotropy, strain effects; Co/Cu, Co/Ag, Co/Au, Fe/Cu, Fe–Co and Fe–Ni nanostructures

Sensor physics & metrology
Sensitivity, FOM and LOD metrics; Fisher-information and Cramér–Rao bounds; field-reversal lock-in detection

SPR & MO-SPR sensing
Kretschmann sensors; 2D materials (TMDCs, phosphorene); NO_2 and humidity detection; cortisol, cancer and One-Health biosensing

Silicon nanophotonics
SOI waveguides, MZI/MMI thermo-optic switches, grating and vertical fibre couplers, ring resonators, multiplexers

AI-enabled sensing systems
Distributed real-time monitoring for industrial emissions, maritime/port decarbonization, agri-food safety and health

Nanofabrication (10+ years)
Cleanrooms in Japan, USA and Canada: sputtering, e-beam and oblique-incidence evaporation, pulse electrodeposition, SOI processing, mask layout (DW-2000)

Modelling & reliability (12+ years)
COMSOL Multiphysics, Lumerical FDTD/MODE/CHARGE, MATLAB, transfer-matrix optics; DFX, SPC, DFR and yield improvement

RESEARCH VISION

Physics first, product second. At a magnetized metal–dielectric interface, Maxwell's equations acquire a gyrotropic permittivity tensor whose off-diagonal element ε_{xy} is proportional to the magnetization **M**. The surface-plasmon-polariton wavevector, $k_{SPP} = (\omega/c)[\varepsilon_m\varepsilon_d/(\varepsilon_m + \varepsilon_d)]^{1/2}$, then acquires a non-reciprocal shift $\Delta k_{SPP} \propto \varepsilon_{xy}$ that reverses with **M**. The resulting transverse magneto-optical Kerr effect, $\delta = [R(+\mathbf{M}) - R(-\mathbf{M})]/R(0)$, provides a field-switchable, differential read-out that rejects common-mode drift and sharpens the resonance figure of merit. Dr. Rizal's program engineers this effect in Co/Au, Ti/Au/Co/Au and 2D-material-enhanced stacks, benchmarks it against SPR, bounds it with estimation theory, and carries it through prototyping into AI-assisted sensor products for environmental, industrial, agri-food and biomedical monitoring.

ENTREPRENEURSHIP & LEADERSHIP

2016 – present

Founder, Chief Executive Officer, Director & Principal Investigator (R&D)
Seed NanoTech International Inc.
Brampton, Ontario, Canada · Charleston, South Carolina, USA

- Founded the venture as Seed NanoTech and Consulting (2016) and incorporated Seed NanoTech International Inc. (2019); Ontario-based deep-tech company developing AI-enabled optical sensors under the banner *"Redefine the Possible"*.
- Leads development of magneto-plasmonic nano-optic sensors that combine optics, plasmonics and magnetics on a compact chip for multi-parameter detection; demonstrated NO_2 and atmospheric-humidity sensing (*Biosensors and Bioelectronics: X*, 2024).
- Directs **PortSense-MP**, an early-stage AI-enabled magnetoplasmonic platform for industrial-emission, port/maritime and environmental gas monitoring, with biosensing extensions; leads fundraising and investor relations.
- Represented Ontario and Canada at **SEMICON Taiwan 2025** (Canadian Pavilion, Taipei) to build semiconductor supply-chain partnerships; selected for the Trade Commissioner Service **Canadian R&D Partnership Delegation for Maritime and Port Decarbonization** (France, 2026).
- Built research and training partnerships across five countries — including Udayana University (Indonesia), MNNIT Allahabad (India), Inatel (Brazil), NexPico (USA) and Ontario institutions such as Niagara College, Trent University, University Canada West, Loyalist College, Toronto School of Management and St. Lawrence College — spanning student placements, joint research and funding applications.
- Launched the community-funding campaign *Supporting Nanosensor Innovation for Sustainable Agriculture* (January 2026) for portable nanosensors for early detection of crop and livestock disease.
- Built an interdisciplinary team of research scientists, design engineers, programmers and business-development staff; leads recruitment, HR and IP strategy; signed an MOU with Udayana University, Indonesia (2023).

2024 – present

Chief Executive Officer
NexPico Inc.
North Andover, Massachusetts, USA

- Leads a deep-tech start-up in pico-scale science: pico-scale materials engineering for sensing, quantum-device prototyping, aerospace and deep-space sensor components, AI-driven materials/device simulation, and shared clean-room access for researchers.

Present

President & Chief Executive Officer
Sustainable Capacity Building and Innovation Foundation (SCBIF)
Brampton, Ontario, Canada

- Leads the foundation's capacity-building, research-training and innovation initiatives linked to the ICAPMOT community.

2020 – present

Founder & Chair, ICAPMOT Conference Series
International Conference on Advanced Magnetics, Plasmonics and Optic Technologies
Canada and international

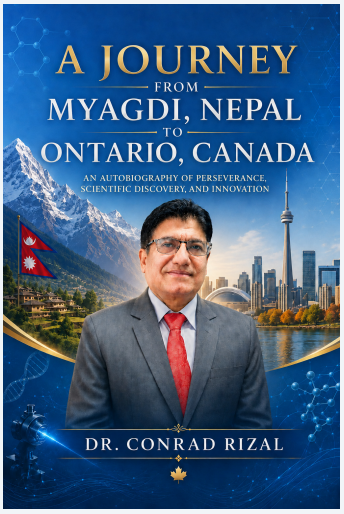
- Annual platform connecting scientists, academics, entrepreneurs and industry; ICAPMOT 2021 held virtually (24–28 May 2021) after the planned 2020 Pokhara, Nepal edition was moved due to COVID-19; session co-chair (2021, 2022); Conference Chair (2025); ICAPMOT 2026 held 22–24 May 2026 at the George Vari Engineering and Computing Centre, Toronto; registration open for ICAPMOT 2027.
- Includes mentorship and resources for youth entrepreneurs alongside scientific sessions.

2019 – 2023

Globalink Advisor / Mentor
Mitacs Canada, York University
Toronto, Ontario, Canada

- Mentored and guided international research scholars under the Mitacs Globalink program.

BOOKS



AUTOBIOGRAPHY · PUBLISHED · AVAILABLE ON AMAZON

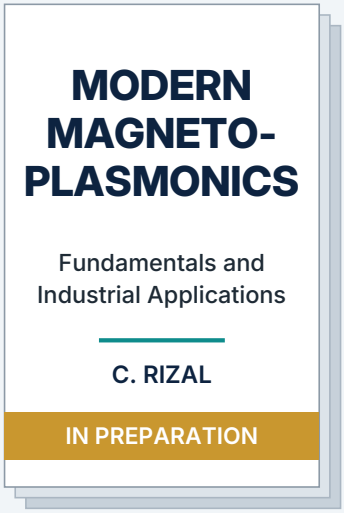
A Journey from Myagdi, Nepal to Ontario, Canada

An Autobiography of Perseverance, Scientific Discovery, and Innovation

Author: Dr. Conrad Rizal
ISBN-10: 1067580506 · **ISBN-13:** 9781067580506

Traces his path from a rural village in Myagdi, Nepal, through engineering studies at BUET (Bangladesh), graduate research in nanoelectronics in Japan as a MEXT Scholar and doctoral research in photonics at UBC, to an international career in science, innovation and entrepreneurship in Canada. Written as an inspirational guide for students and young readers on resilience, discipline and using science for the benefit of humanity; book sales support research and help underserved communities gain access to affordable technology.

amazon.ca/dp/1067580506



SCHOLARLY MONOGRAPH · MANUSCRIPT IN PREPARATION (NOT YET PUBLISHED)

Modern Magnetoplasmonics: Fundamentals and Industrial Applications

Lead author: C. Rizal

Comprehensive monograph of about 850 manuscript pages in 40 chapters and five parts: (I) optical, plasmonic and sensing foundations; (II) magneto-optical foundations, materials and characterization; (III) integrated magnetoplasmonic platforms; (IV) magnetophotonics; and (V) industrial translation and future outlook.

Bridges Maxwell-equation foundations, Faraday, Kerr and Voigt magneto-optics, MO-SPR sensing metrics, computational modelling and commercialization pathways for graduate students, researchers and industry.

Status: manuscript in final preparation for submission to an academic publisher.

Book chapter

B1 **C. Rizal** and Y. Ueda, "Effects of annealing on magnetization and nanostructures of cobalt–gold," in *Proc. 4th International Conference on Computer and Electrical Engineering (ICCEE 2011)*, ASME Press, pp. 415–419 (2011). doi:10.1115/1.859841.paper67

INTERNATIONAL TALKS & GLOBAL ENGAGEMENT — DETAILS

Invited lectures & keynotes

YEAR	TITLE	HOST & LOCATION	ROLE
2026	Magnetoplasmonics Sensor: Theory, Instrumentation, and Its Applications (Physics General Lecture 2026)	Faculty of Mathematics & Natural Sciences, Universitas Udayana, Bali, Indonesia (5 Oct. 2026)	*Invited lecture*
2025	Emerging Trends in Magneto-Plasmonic Sensors	International Nanotech Forum 2025, IIT Delhi, New Delhi, India	*Guest lecture*
2025	Surface Plasmon Resonance and Magneto-Optics for Portable Devices	Magneto-Optics Research Exchange, Universitas Gadjah Mada (UGM), Yogyakarta, Indonesia	*Guest lecture*
2024	Pioneering Innovation from Research on Plasmonics and Magnetics Leading to Prototyping and Industrial Application	Research Center for Nanoscience & Nanotechnology, Institut Teknologi Bandung (ITB), Indonesia	*Guest lecture*
2024	Strategies for Translating Research Outcomes into Products and Commercialization / Industrial Application	Research Center for Nanoscience & Nanotechnology, ITB, Bandung, Indonesia	*Guest lecture*
2024	Magnetoplasmonics: Fundamentals and Industrial Applications	Faculty of Mathematics & Natural Sciences, Udayana University, Bali, Indonesia	*Keynote*
2024	Modern Magnetoplasmonics: Fundamental Research Leading to Prototyping and Industrial Applications	Udayana University, Bali, Indonesia	*Guest lecture*

YEAR	TITLE	HOST & LOCATION	ROLE
2024	Modern Magnetoplasmonics: Fundamental Research Leading to Prototyping and Industrial Application	Universitas Gadjah Mada, Yogyakarta, Indonesia	*Guest lecture*
2024	Comparative Analysis of Research Commercialization: Translating Academic Research into Industrial Application	IEEE Photonics Society, Motilal Nehru National Institute of Technology (MNNIT), Allahabad, India	*Guest lecture*
2024	Nanotechnology Applications in Agriculture, Environment and Biomedical Sectors: Current Status and Future Prospects	Central Campus of Technology, Dharan, Nepal	*Keynote*
2024	Nanotechnology and Its Application	Graduate School of Science & Technology, Mid-West University, Surkhet, Nepal	*Invited talk*
2024	What It Takes to Be a Successful Entrepreneur	Rotary Club of Birtamod, Nepal	*Keynote*
2024	How to Become an Entrepreneur	Nepalese Young Entrepreneurs' Forum (NYEF), Biratnagar, Nepal	*Keynote*
2024	How to Become a Successful Entrepreneur	Manmohan Technical University, Morang, Nepal	*Invited talk*
2023	Magneto-optic-Plasmonics and Its Potential in Industry	ITB Research Center for Nanosciences & Nanotechnology (PPNN), Bandung, Indonesia	*Guest lecture*
2023	Developing Nanostructures for Enhanced Surface Plasmon-Polariton Resonance (SPR) Response and Magnetic-Activity-Enhanced Sensors	Science and Technology International Conference, Udayana University, Bali, Indonesia	*Guest lecture*
2023	Pioneering Innovations for Research on Plasmonics and Magnetics Leading to Prototyping and Industrial Applications	Udayana University, Bali, Indonesia	*Guest lecture*
2023	Advancing Sensor Technologies for Environmental Monitoring	Nepal Tech & Innovation Symposium, Department of Chemistry, Tribhuvan University, Kirtipur, Nepal	*Guest lecture*
2023	Revolutionizing Healthcare: Harnessing Nanotechnology and Biosensors for Pharmacy, Public Health, Nursing and Lab Technology	Purbanchal University, Gothgau, Nepal	*Keynote*
2023	What Is Nanotechnology and Its Potential in the Environment and Biomedical Fields	Chaitanya Pathshala, Dhangadhi, Nepal	*Keynote*
2023	Most Inspiring Career Success Stories: A Global Journey That Begins from Nepal	Human Capital Development Professionals Nepal, Kathmandu	*Keynote*
2023	Nanotechnology, Robotics and Cyber Security	Aryan College, New Baneshwor, Kathmandu, Nepal	*Invited talk*
2023	Nanotechnology and Its Application: Future Prospects	SAAN International College, Gairidhara, Kathmandu, Nepal	*Invited talk*
2022	Journey from Engineer to Entrepreneur	International School, Vietnam National University, Hanoi, Vietnam	*Invited talk*
2019	Entrepreneurship and Leadership	Global Citizen Summit, OYES Foundation / International Youth Society, Bangkok, Thailand	*Keynote*

Conference leadership, chairing & judging

YEAR	EVENT	ORGANIZER / LOCATION	ROLE
2026	ICAPMOT 2026 – Where Business Meets Research & Innovation (22–24 May 2026)	George Vari Engineering and Computing Centre, Toronto, Canada	*Founder & Chair*
2025	ICAPMOT 2025 – Business, Management, Technology, Innovation, Leadership & Entrepreneurship	Seed NanoTech International Inc., Brampton, Canada	*Conference Chair*
2025	Innovation Showcase	Toronto Metropolitan University (TMU), Toronto, Canada	*Judge*
2022	ICAPMOT 2022 – Plasmonics and Magneto-optics Technologies session	Brampton, Canada	*Session co-chair*
2021	ICAPMOT 2021 – Plasmonics and Magneto-optics Technologies session	Virtual, 24–28 May 2021	*Chair; session co-chair*

Trade delegations, exhibitions, agreements & research visits

YEAR	ACTIVITY	HOST & LOCATION	ROLE
2026	Canadian R&D Partnership Delegation for Maritime and Port Decarbonization	Trade Commissioner Service (Government of Canada); several cities, France	*Delegate*
2025	Seed NanoTech magneto-plasmonic nano-optic sensors, Canadian Pavilion	SEMICON Taiwan 2025, Nangang Exhibition Hall, Taipei (10–12 Sept. 2025)	*Exhibitor; Ontario delegate*
2024	Laboratory visits and collaboration meetings with faculty and students	IIIT Allahabad and University of Allahabad, India	*Visiting scientist*
2024	Academic exchange visit	Sapporo, Hokkaido, Japan	*Visiting scientist*
2023	Memorandum of Understanding for joint collaboration, information and faculty exchange	Udayana University, Bali, Indonesia	*Signatory*
2023	Laboratory visit and meeting with Mr. Mahabir Pun	National Innovation Centre, Kirtipur, Kathmandu, Nepal	*Visitor*
2017	Research visit (21–29 May 2017)	Russian Quantum Center, Moscow, Russia	*Visiting researcher*
2016	Plasmonics research collaboration with Prof. Howard Lee (14 July 2016)	Texas A&M University, USA	*Collaborator*

Conference participation & contributed presentations

YEAR	EVENT / PAPER	LOCATION	ROLE
2020	Magneto-optic SPR-based Biosensors (paper C1)	IEEE Photonics North 2020, Canada	*Author / presenter*
2018	World Biosensors Congress (11–14 June 2018)	Florida, USA	*Participant*
2014	Manufacturing & Trade-Show Conference (9 June 2014)	Ohio, USA	*Participant*
2013	SUR/FIN Conference (20 May 2013)	Chicago, USA	*Participant*
2012	Applied Magnetic Materials Conference (3 Oct. 2012)	Pori, Finland	*Participant*

RESEARCH & PROFESSIONAL APPOINTMENTS

2016 – 2019

Research Scientist & Product Developer (Photonics Laboratory)

GEM Systems Inc.

Markham, Ontario, Canada

- Developed and field-tested high-sensitivity magnetometers for geophysical applications; laid the groundwork for plasmonics-based nano-sensors and instruments; Guest Editor of an MDPI special issue on magnetoplasmonics from this post.

2016 – 2018

Mitacs Elevate Postdoctoral Research Fellow

Department of Electrical Engineering & Computer Science, York University (with Prof. Simone Pisana; industry partner GEM Systems Inc.)

Toronto, Ontario, Canada

- Two-year Mitacs Elevate project: *Developing a new magnetic sensor for application in biosensing and surveying*. Per the Mitacs project summary, theoretical modelling predicted up to ~1000-fold higher sensitivity than existing biosensors under optimal design conditions, with detectable optical-property changes as small as ~100 ppb (theoretical, not a measured result).
- Built benchtop demonstrators combining magnetic and plasmonic effects; produced the MO-SPR vs SPR sensitivity framework.

2016

Visiting Research Scientist

Baylor University (with Prof. Howard Lee)

Waco, Texas, USA

- Managed advanced sputtering systems, performed optical simulations, and designed nanophotonic experiments and devices.

2014 – 2016

NSERC Postdoctoral Fellow

Center for Magnetic Recording Research (CMRR), University of California San Diego (Prof. Eric E. Fullerton; co-advisor Prof. Zhaowei Liu)

La Jolla, California, USA

- Led projects on metamaterials, magnetic nanostructures, perpendicular magnetic anisotropy and multilayer sensor design and characterization.

2012 – 2014

Postdoctoral Fellow

University of Victoria

Victoria, British Columbia, Canada

- Directed biosensor projects on highly sensitive plasmonic and magnetoplasmonic detection platforms for biomedical applications.

2006 – 2012

Doctoral Researcher & Teaching Assistant (2006–2010)

Department of Electrical & Computer Engineering, The University of British Columbia

Vancouver, British Columbia, Canada

- Led four projects on magneto-optical sensors, ultrafast photonic switches and nanoscale modulators; delivered electronics, circuits and materials-science laboratory tutorials.

1999 – 2004

Graduate Researcher (MEXT Scholar)

Muroran Institute of Technology (Profs. Yuji Ueda and Shigeyuki Murayama)

Muroran, Hokkaido, Japan

- Developed pulse-electrodeposited and evaporated GMR multilayers and granular alloys; first journal paper in 2002.

1996 – 1997

Electrical & Electronic Engineer
Venus Electrical Training & Construction Est.
Doha, Qatar

EDUCATION

2006 – 2012

Ph.D., Electrical & Computer Engineering (Photonics & Nanoelectronics)
The University of British Columbia (UBC), Vancouver, Canada
GPA 3.7 / 4.0

- Thesis: *Giant magnetoresistance and magnetic properties of ferromagnetic hybrid nanostructures* (2012).
- Academic advisor Prof. Nicolas A. F. Jaeger; supervisory committee Profs. Lukas Chrostowski and John Madden; committee member Prof. Edmond Cretu; external examiner Prof. Jian-Ping Wang (University of Minnesota).

1999 – 2004

M.Sc. and D.Eng., Electrical & Electronic Engineering (Nanoelectronics)
Muroran Institute of Technology, Hokkaido, Japan
GPA 4.0 / 4.0 · MEXT (Monbukagakusho) Scholarship, Government of Japan

1988 – 1994

B.Sc. Eng., Electrical & Electronic Engineering
Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh
CGPA 3.62 / 4.0

1986 – 1988

Intermediate in Science (Physical Group)
Amrit Science College, Tribhuvan University, Kathmandu, Nepal
First Class (A+)

2022 – 2023

Postgraduate Diploma, Human Resources Management
School of Business, Algonquin College, Ottawa, Canada
GPA A

HONOURS & DISTINCTIONS

2013 — **Gold Medal**, conferred by the President of Nepal, for global contributions to science and innovation.

2008 – 2009 — **Volunteer Award**, The University of British Columbia.

Professional — **Senior Member, IEEE** (SMIEEE) · **Chartered Engineer (CEng), Institution of Engineering and Technology**, UK.

RESEARCH FUNDING & FELLOWSHIPS

Authored **10+ competitive research proposals** in Canada, Japan and the USA, of which **9 were funded**. Selected funded awards are listed below; award amounts are not publicly reported and are available on request.

PERIOD	AWARD / PROJECT	FUNDER & HOST	ROLE
2016–2018	Mitacs Elevate Postdoctoral Fellowship (Years 1–2): Developing a new magnetic sensor for application in biosensing and surveying	Mitacs Canada with industry partner GEM Systems Inc.; York University (supervisor Prof. S. Pisana)	*Funded postdoctoral fellow*
2014–2016	NSERC Postdoctoral Fellowship	Natural Sciences and Engineering Research Council of Canada; UC San Diego (CMRR)	*Fellowship holder*

PERIOD	AWARD / PROJECT	FUNDER & HOST	ROLE
2012	NSERC Industrial R&D Fellowship (IRDF)	Natural Sciences and Engineering Research Council of Canada	*Fellowship holder*
1999–2004	MEXT (Monbukagakusho) Scholarship for graduate study (M.Sc. and D.Eng.)	Ministry of Education, Culture, Sports, Science and Technology, Japan; Muroran Institute of Technology	*Scholarship holder*

INTELLECTUAL PROPERTY

Patent applications (no granted patents are listed)

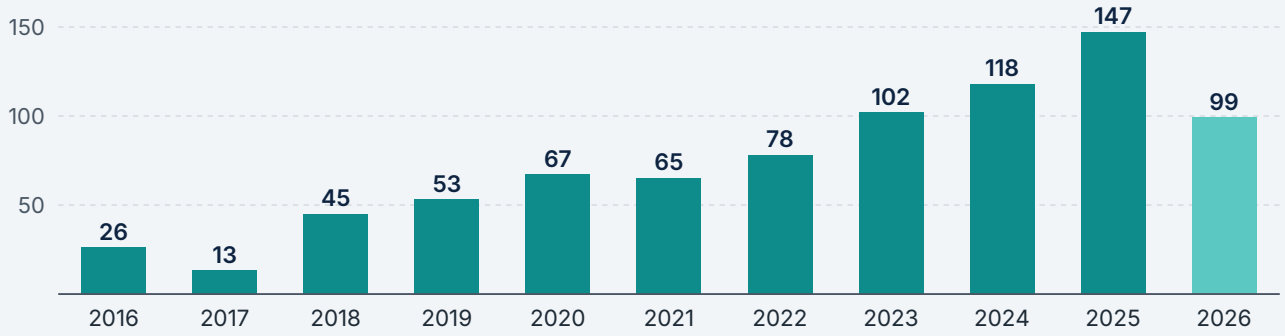
2026 — **U.S. Non-Provisional Patent Application No. 19/746,633** (filed July 2026; **pending**) — magneto-optic–plasmonic (MOP) multilayer films for surface plasmon resonance and magneto-optic SPR / T-MOKE sensing. Inventor: C. Rizal.

2021 – 2022 — **U.S. Patent Application Publication US 2022/0229318 A1** (Appl. No. 17/232,641, filed 16 April 2021; priority to U.S. Provisional 63/065,076, 13 August 2020; published 21 July 2022), "Materials and methods used with plasmon resonance detection techniques" — multilayer Ti/Au(Ag)/Co/Au magneto-optic–plasmonic films for surface plasmon detection. Inventor: C. Rizal. Published application; not granted.

Know-how — Proprietary nanofabrication, thin-film engineering and computational-modelling processes for magnetoplasmonic sensor chips (Seed NanoTech).

PUBLICATIONS

Citations per year (OpenAlex, retrieved 7 Nov 2026) *2026 = January to November*



Bibliometric snapshot. OpenAlex (author A5050638612, retrieved 7 Nov 2026): 56 indexed works, **873 citations**, **h-index 18**, **i10-index 24**; annual citations have more than doubled since 2021. **Counting basis:** the list below contains the **44 published items** verified through DOI, publisher or index records (8 reviews, 28 research articles, 3 energy-policy articles, 5 proceedings, digests and chapters), plus the doctoral thesis and 3 manuscripts in review. SciProfiles lists 97 publication records (77 journal articles); the author's figure of 100+ outputs also counts conference digests and abstracts. The full record is maintained on Google Scholar, ORCID and Scopus. Collaborators span Canada, the USA, Russia, Italy, Brazil, Japan, India, Indonesia, Thailand, Bangladesh and Nepal.

Most-cited works

#	AUTHORS	WORK	VENUE	YEAR	CITES
1	Aliofkhazraei, …, **Rizal**, et al.	Electrodeposited multilayer coatings: fabrication, microstructure, properties & applications (review)	*Appl. Surf. Sci. Adv.*	2021	129
2	Hasib, Nur, **Rizal**, Shushama	Improved transition-metal-dichalcogenide-based SPR biosensors	*Condensed Matter*	2019	58
3	**Rizal**, Shimizu, Mejía-Salazar	Magneto-optics effects: new trends and future prospects	*Magnetochemistry*	2022	57
4	**Rizal**, Manera, Ignatyeva, et al.	Magnetophotonics for sensing and magnetometry toward industrial applications (Perspective)	*J. Appl. Phys.*	2021	55
5	**Rizal**, Pisana, Hrvoic	Improved magneto-optic surface plasmon resonance biosensors	*Photonics*	2018	55
6	**Rizal**, Moa, Niraula	Ferromagnetic multilayers: magnetoresistance, magnetic anisotropy, and beyond	*Magnetochemistry*	2016	41
7	**Rizal**, Belotelov	Sensitivity comparison of SPR and magneto-optic SPR biosensors	*Eur. Phys. J. Plus*	2019	36
8	**Rizal**, Belotelov, Ignatyeva, Zvezdin, Pisana	Surface plasmon resonance (SPR) to magneto-optic SPR	*Condensed Matter*	2019	36
9	**Rizal**, Kolthammer, Pokharel, Choi	Magnetic properties of nanostructured Fe-Co alloys	*J. Appl. Phys.*	2013	32
10	**Rizal**, Pisana, Hrvoic, Fullerton	Microstructure and magneto-optical SPR of Co/Au multilayers	*J. Phys. Commun.*	2018	30

Citation counts from OpenAlex, 7 November 2026; Google Scholar counts are typically higher.

A. Reviews, perspectives & editorials (8)

R1 REVIEW **C. Rizal**, "Recent Advances in Magnetooptics: Innovations in Materials, Techniques, and Applications," *Magnetism* **6**(1), 3 (2026). doi:10.3390/magnetism6010003

R2 REVIEW **C. Rizal**, H. Shimizu, and J. R. Mejía-Salazar, "Magneto-Optics Effects: New Trends and Future Prospects for Technological Developments," *Magnetochemistry* **8**(9), 94 (2022). doi:10.3390/magnetochemistry8090094

R3 PERSPECTIVE **C. Rizal**, M. G. Manera, D. O. Ignatyeva, J. R. Mejía-Salazar, R. Rella, V. I. Belotelov, F. Pineider, and N. Maccaferri, "Magnetophotonics for sensing and magnetometry toward industrial applications," *Journal of Applied Physics* **130**(23), 230901 (2021). doi:10.1063/5.0072884

R4 REVIEW M. Aliofkhazraei, F. C. Walsh, G. Zangari, H. Köçkar, M. Alper, **C. Rizal**, L. Magagnin, V. Protsenko, R. Arunachalam, A. Rezvanian, A. Moein, S. Assareh, and M. H. Allahyarzadeh, "Development of electrodeposited multilayer coatings: A review of fabrication, microstructure, properties and applications," *Applied Surface Science Advances* **6**, 100141 (2021). doi:10.1016/j.apsadv.2021.100141

R5 EDITORIAL **C. Rizal**, V. Belotelov, D. Ignatyeva, A. K. Zvezdin, and S. Pisana, "Surface Plasmon Resonance (SPR) to Magneto-Optic SPR," *Condensed Matter* **4**(2), 50 (2019). doi:10.3390/condmat4020050

R6 REVIEW **C. Rizal**, B. Moa, and B. Niraula, "Ferromagnetic Multilayers: Magnetoresistance, Magnetic Anisotropy, and Beyond," *Magnetochemistry* **2**(2), 22 (2016). doi:10.3390/magnetochemistry2020022

R7 REVIEW **C. Rizal**, "Bio-Magnetoplasmonics, Emerging Biomedical Technologies and Beyond," *Journal of Nanomedicine Research* **3**(3) (2016). doi:10.15406/jnmr.2016.03.00059

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B. Peer-reviewed research articles (28)

J1 **C. Rizal** and S. Malla, "Optimized magneto-optic multilayer structures for enhanced surface plasmon resonance detection," *Journal of Applied Physics* **138**(7), 074901 (2025). doi:10.1063/5.0279868

J2 K. M. Setiawan, A. R. Humaidi, F. Hidayat, N. Elsoraya, A. Hanifah, M. Alfiah, F. V. Steky, P. Milana, K. Fukutani, **C. Rizal**, and V. Suendo, "Synthesis of Polyaniline/Sulfonated Polyaniline (PANI:SPAN) Acid–Base Pair Mimicking PEDOT:PSS Intermolecular Structure as a Hole-Transporting Layer," *ACS Applied Electronic Materials* **7**(20), 9368-9379 (2025). doi:10.1021/acsaelm.5c01316

J3 R. Sapkota, S. Isik, H. Suyanto, N. N. Rupiasih, N. Ingles, and **C. Rizal**, "Sensor with combined plasmonic and magnetic activities," *Biosensors and Bioelectronics: X* **19**, 100506 (2024). doi:10.1016/j.biosx.2024.100506

J4 V. K. Verma, S. Pal, **C. Rizal**, and Y. K. Prajapati, "Tunable and sensitive detection of cortisol using anisotropic phosphorene with a surface plasmon resonance technique: numerical investigation," *Magnetochemistry* **8**(3), 31 (2022). doi:10.3390/magnetochemistry8030031

J5 **C. Rizal**, "Magneto-Optic-Plasmonic Sensors With Improved Performance," *IEEE Transactions on Magnetics* **57**(2), 1-5 (2021). doi:10.1109/tmag.2020.3012468

J6 **C. Rizal**, P. O. Kapralov, D. Ignatyeva, V. Belotelov, and S. Pisana, "Comparison of the effects of surface plasmon resonance and the transverse magneto-optic Kerr effect in magneto-optic plasmonic nanostructures," *Journal of Physics D: Applied Physics* **53**(2), 02LT02 (2020). doi:10.1088/1361-6463/ab4ec0

J7 M. H. H. Hasib, J. N. Nur, **C. Rizal**, and K. N. Shushama, "Improved Transition Metal Dichalcogenides-Based Surface Plasmon Resonance Biosensors," *Condensed Matter* **4**(2), 49 (2019). doi:10.3390/condmat4020049

J8 **C. Rizal** and V. Belotelov, "Sensitivity comparison of surface plasmon resonance (SPR) and magneto-optic SPR biosensors," *The European Physical Journal Plus* **134**(9), 435 (2019). doi:10.1140/epjp/i2019-12819-3

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J11 **C. Rizal**, S. Pisana, and I. Hrvoic, "Improved Magneto-Optic Surface Plasmon Resonance Biosensors," *Photonics* **5**(3), 15 (2018). doi:10.3390/photonics5030015

J12 **C. Rizal**, S. Pisana, I. Hrvoic, and E. E. Fullerton, "Microstructure and magneto-optical surface plasmon resonance of Co/Au multilayers," *Journal of Physics Communications* **2**(5), 055010 (2018). doi:10.1088/2399-6528/aac0e0

J13 **C. Rizal**, "Microstructure, Surface Plasmon, Magneto-Optic Surface Plasmon, and Sensitivity Properties of Magneto-Plasmonic Co/Au Multilayers," *IEEE Transactions on Magnetics* **54**(10), 1-9 (2018). doi:10.1109/tmag.2018.2854663

J14 **C. Rizal**, "Magneto-Optic Surface Plasmon Resonance Ti/Au/Co/Au/Pc Configuration and Sensitivity," *Magnetochemistry* **4**(3), 35 (2018). doi:10.3390/magnetochemistry4030035

J15 B. B. Niraula and **C. Rizal**, "Photoluminescence property of Eu^{3+}-doped $CaSiO_3$ nano-phosphor with controlled grain size," *Colloids and Interfaces* **2**(4), 52 (2018). doi:10.3390/colloids2040052

J16 **C. Rizal** and E. E. Fullerton, "Perpendicular magnetic anisotropy and microstructure properties of nanoscale Co/Au multilayers," *Journal of Physics D: Applied Physics* **50**(35), 355002 (2017). doi:10.1088/1361-6463/aa7c5b

J17 **C. Rizal**, B. Moa, J. Wingert, and O. G. Shpyrko, "Magnetic Anisotropy and Magnetoresistance Properties of Co/Au Multilayers," *IEEE Transactions on Magnetics* **51**(2), 1-6 (2015). doi:10.1109/tmag.2014.2352932

J18 **C. Rizal**, J. Kolthammer, R. K. Pokharel, and B. C. Choi, "Magnetic properties of nanostructured Fe-Co alloys," *Journal of Applied Physics* **113**(11), 113905 (2013). doi:10.1063/1.4795267

J19 **C. Rizal**, P. Gyawali, I. Kshattry, and R. K. Pokharel, "Strain-induced magnetoresistance and magnetic anisotropy properties of Co/Cu multilayers," *Journal of Applied Physics* **111**(7), 07C107 (2012). doi:10.1063/1.3671788

J20 **C. Rizal**, Y. Ueda, and B. R. Karki, "Magnetic properties of Fe/Cu multilayers prepared using pulsed-current electrodeposition," *Journal of Nano- and Electronic Physics* **4**(1), 01001 (2012). jnep.sumdu.edu.ua/en/full_article/331

J21 **C. Rizal**, Y. Ueda, and R. K. Pokharel, "Magnetotransport Properties of Co-Au Granular Alloys," *International Journal of Applied Physics and Mathematics*, 161-166 (2011). doi:10.7763/ijapm.2011.v1.31

J22 **C. Rizal**, "Magnetoresistance and magnetic properties of Co(t_{Co})/Cu multilayer films," *IEEE Transactions on Magnetics* **46**(6), 2394-2396 (2010). doi:10.1109/tmag.2010.2044761

J23 **C. Rizal** and Y. Ueda, "Magnetoresistance and Magnetic Anisotropy Properties of Strain-Induced Co/Ag Multilayer Films," *IEEE Transactions on Magnetics* **45**(6), 2399-2402 (2009). doi:10.1109/tmag.2009.2018588

J24 **C. Rizal**, "Study of magnetic anisotropy and magnetoresistance effects in ferromagnetic Co/Au multilayer films prepared by oblique incidence evaporation method," *Journal of Magnetism and Magnetic Materials* **310**(2), e646-e648 (2007). doi:10.1016/j.jmmm.2006.10.591

J25 **C. Rizal**, A. Yamada, Y. Hori, S. Ishida, M. Matsuda, and Y. Ueda, "Magnetic properties and magnetoresistance effect in Co/Au, Ag nano-structure films produced by pulse electrodeposition," *Physica Status Solidi (c)* **1**(7), 1756-1759 (2004). doi:10.1002/pssc.200304415

J26 Y. Ueda, H. Adachi, W. Takakura, **C. Rizal**, and S. Chikazawa, "Magnetoresistance effect and magnetoanisotropy of Co/Cu multilayered films prepared by electron beam evaporation," *Physica Status Solidi (c)* **1**(7), 1752-1755 (2004). doi:10.1002/pssc.200304416

J27 A. Yamada, **C. Rizal**, S. Murata, and Y. Ueda, "Electric properties of Ni-Co based multilayer films produced by pulse control electrodeposition method," *Journal of the Surface Finishing Society of Japan* **55**(2), 151-152 (2004). doi:10.4139/sfj.55.151

J28 A. Yamada, M. Shirota, **C. Rizal**, T. Houga, and Y. Ueda, "Electric and Magnetic Properties of Fe-Ni Based Particle and Multilayer Films Produced by Pulse Control Electrodeposition Method," *Journal of the Japan Institute of Metals* **66**(9), 869-872 (2002). doi:10.2320/jinstmet1952.66.9_869

C. Sustainable energy & technology policy (3)

E1 S. Bhandari, **C. Rizal**, and K. Techato, "Harnessing solar energy in Nepal: financial viability and barriers to adoption," *Renewable Energy and Environmental Sustainability* **11**, 2 (2026). doi:10.1051/rees/2025002

E2 S. Bhandari, D. Neupane, and **C. Rizal**, "Solar Energy Adoption in Nepal's Industrial Sector," *New Energy Exploitation and Application* **5**(3), 86-108 (2026). doi:10.54963/neea.v5i3.103334

E3 S. Bhandari and **C. Rizal**, "Household Solar Adoption in Kathmandu Valley, Nepal: Affordability, Energy Security and Policy Pathways for Sustainable Development," *Journal of Asian Energy Studies* **10**, 143-166 (2026). doi:10.24112/jaes.100007

D. Conference proceedings, digests & book chapters (5)

C1 **C. Rizal**, "Magneto-optic SPR-based Biosensors," *Proc. IEEE Photonics North (PN 2020)*, 1-1 (2020). doi:10.1109/pn50013.2020.9166966

C2 CONFERENCE DIGEST **C. Rizal**, B. Moa, and A. G. Brolo, "Recent advances on magnetic multilayer-based magnetoplasmonic sensors for biomedical applications," *Canadian Medical and Biological Engineering Society (CMBES) Conference, digest* (2014).

C3 **C. Rizal**, P. Gyawali, I. Kshattry, Y. Ueda, and R. K. Pokharel, "Effect of strain on magnetoresistance and magnetic properties of Co(t_{Co})/Ag nanostructures," *Proc. IEEE Nanotechnology Materials and Devices Conference (NMDC 2011)*, 120-124 (2011). doi:10.1109/nmdc.2011.6155324

C4 BOOK CHAPTER **C. Rizal** and Y. Ueda, "Effects of Annealing on Magnetization and Nanostructures of Cobalt-Gold," *Proc. 4th International Conference on Computer and Electrical Engineering (ICCEE 2011), ASME Press*, 415-419 (2011). doi:10.1115/1.859841.paper67

C5 **C. Rizal** and Y. Ueda, "Magnetoresistance effect and magnetic properties of strain induced Co/Cu multilayer films," *Proc. 3rd IEEE International Nanoelectronics Conference (INEC 2010)*, 927-928 (2010). doi:10.1109/inec.2010.5425119

E. Doctoral thesis

T1 PH.D. THESIS **C. Rizal**, "Giant magnetoresistance and magnetic properties of ferromagnetic hybrid nanostructures," *Ph.D. dissertation, Electrical and Computer Engineering, The University of British Columbia, Vancouver, Canada* (2012). doi:10.14288/1.0072672

F. Manuscripts under review, in revision or submitted (2026)

M1 UNDER REVIEW **C. Rizal**, "Fisher-information limits and fundamental bounds of magnetoplasmonic refractive-index sensing," *Under review, Journal of the Optical Society of America B (Optica); preprint on Optica Open* (2026). doi:10.1364/opticaopen.34881720

M2 IN REVISION **C. Rizal**, "Surface plasmon and magneto-optic nanosensors: why they matter for Nepal," *Journal of Institute of Science and Technology (Tribhuvan University), in revision* (2026).

M3 SUBMITTED **C. Rizal**, "From fundamental physics to deep-tech innovation: bridging magnetoplasmonic science, optical instrumentation, and societal impact," *Submitted, Philippine Journal of Science (DOST)* (2026).

Further sole- and co-authored reviews are in preparation on magnetoplasmonic One-Health diagnostics, localized SPR, agri-food nanosensors, magnetoplasmonic sensing for maritime and port decarbonization, and the history of optical sensing.

TEACHING, MENTORING & OUTREACH

- Began his career as a young teacher in Nepal; since 2012 has taught undergraduate courses and laboratories in electrical, materials and computer engineering at universities and colleges in Canada and the USA.
- Supervises postgraduate student research and conference papers through Seed NanoTech (2026).
- Teaching Assistant at UBC (2006–2010) for electronics, circuits and materials-science laboratories.
- Mitacs Globalink Advisor/Mentor (2019–2023); mentors postgraduate students and early-career researchers through Seed NanoTech and co-authored work with students and faculty in Indonesia, India, Bangladesh, Thailand and Nepal.
- More than twenty motivational and entrepreneurship lectures to students and young entrepreneurs in Nepal, India, Indonesia, Vietnam and Thailand.
- Featured in a 2025 *TechSoda* profile of Seed NanoTech and its magneto-plasmonic sensors ahead of SEMICON Taiwan 2025.

TECHNICAL & BUSINESS SKILLS

Simulation	COMSOL Multiphysics; Lumerical FDTD, MODE and CHARGE; MATLAB; transfer-matrix and Fresnel modelling of multilayer MO stacks.
Fabrication	Magnetron sputtering; e-beam and oblique-incidence evaporation; pulse-controlled electrodeposition; SOI wafer processing on 6-inch wafers; etch-process control; device packaging; compact 1.6 × 1.6 mm^2 photonic masks.
Characterization	SPR / MO-SPR and T-MOKE spectroscopy (Kretschmann, field reversal, lock-in detection); magnetotransport (GMR/AMR); magnetic anisotropy; microstructure; photoluminescence; gas and humidity sensor testing.
Manufacturing	Pilot-scale manufacturing set-up; foundry process redesign and reliability testing; DFX, SPC and DFR; waveguide (Y-branch, coupler, taper) yield improvement.
Business	Venture formation and incorporation (Canada and USA); fundraising and investor relations; IP and patent strategy; HR management; trade missions; international conference organization; university–industry partnerships.

ONLINE PROFILES

Website	conrad.seed-nanotech.com · seed-nanotech.com · nexpico.com
Scholarly	Google Scholar · ORCID 0000-0002-4599-6353 · Scopus 6507553704 · SciProfiles · Frontiers Loop
Social	LinkedIn · X / Twitter @RizConrad

INTERNATIONAL COLLABORATION

Academic and research institutions outside Canada where Dr. Rizal has delivered lectures, made research visits, signed agreements, studied or co-authored work: **30 institutions in 12 countries**.

INSTITUTION	CITY	COUNTRY	ENGAGEMENT
Tribhuvan University, Central Department of Chemistry	Kirtipur, Kathmandu	Nepal	Guest lecture, Nepal Tech & Innovation Symposium (2023)
Central Campus of Technology (Tribhuvan University)	Dharan	Nepal	Keynote lecture (2024)
Purbanchal University	Gothgau, Morang	Nepal	Keynote lecture (2023)
Mid-West University, Graduate School of Science & Technology	Surkhet	Nepal	Invited lecture (2024)
Manmohan Technical University	Morang	Nepal	Invited lecture (2024)
Aryan College	New Baneshwor, Kathmandu	Nepal	Invited lecture (2023)
SAAN International College	Gairidhara, Kathmandu	Nepal	Invited lecture (2023)
Chaitanya Pathshala	Dhangadhi	Nepal	Keynote lecture (2023)
National Innovation Centre	Kirtipur, Kathmandu	Nepal	Laboratory visit (2023)
Universitas Udayana, Faculty of Mathematics & Natural Sciences	Jimbaran, Bali	Indonesia	MOU (2023); lectures (2023, 2024, 2026); co-authored paper (2024)
Institut Teknologi Bandung (ITB), Research Center for Nanosciences & Nanotechnology	Bandung	Indonesia	Guest lectures (2023, 2024); co-authored paper (2025)
Universitas Gadjah Mada (UGM)	Yogyakarta	Indonesia	Guest lectures (2024, 2025)
Motilal Nehru National Institute of Technology (MNNIT) Allahabad	Prayagraj	India	Guest lecture (2024); co-authored paper (2022); co-Guest Editor, *Photonics* (2026–27)
Indian Institute of Technology (IIT) Delhi	New Delhi	India	Guest lecture, International Nanotech Forum (2025)
Indian Institute of Information Technology (IIIT) Allahabad	Prayagraj	India	Laboratory visit and faculty meetings (2024)
University of Allahabad	Prayagraj	India	Faculty visit and collaboration meetings (2024)
Tokyo University of Agriculture and Technology (TUAT)	Koganei, Tokyo	Japan	Co-authored review (2022); co-Guest Editors, *Magnetochemistry* (2021–22)
Muroran Institute of Technology	Muroran, Hokkaido	Japan	M.Sc./D.Eng. research (1999–2004); co-authored papers (2002–2012)
Kyushu University	Fukuoka	Japan	Co-authored papers (2011–2013)
International School, Vietnam National University (VNU-IS)	Hanoi	Vietnam	Invited talk; industry–academia partnership visit (2022)
Institute of Technology of Cambodia (ITC)	Phnom Penh	Cambodia	Cambodia–Canada agri-food sensing review submitted to ITC's *Techno-Science Research Journal* (2026)
Prince of Songkla University	Hat Yai, Songkhla	Thailand	Co-authored paper (2026)

INSTITUTION	CITY	COUNTRY	ENGAGEMENT
Bangladesh University of Engineering and Technology (BUET)	Dhaka	Bangladesh	B.Sc. (alma mater)
National Institute of Telecommunications (Inatel)	Santa Rita do Sapucaí, Minas Gerais	Brazil	Co-authored papers (2021, 2022); co-Guest Editors, *Magnetochemistry*; research partnership
Russian Quantum Center	Moscow	Russia	Research visit (2017); co-authored papers (2019–2021)
University of Pisa	Pisa	Italy	Co-authored Perspective, *J. Appl. Phys.* (2021)
CNR Institute for Microelectronics and Microsystems (CNR-IMM)	Lecce	Italy	Co-authored Perspective, *J. Appl. Phys.* (2021)
University of California San Diego	La Jolla, California	USA	NSERC Postdoctoral Fellow (2014–2016); co-authored papers
Baylor University	Waco, Texas	USA	Visiting Research Scientist (2016)
Texas A&M University	College Station, Texas	USA	Research collaboration visit (2016)

References available upon request. Compiled November 2026 from the author's website, ORCID-linked Crossref records, OpenAlex, SciProfiles, MDPI, Mitacs and public company sources.