



ABHIK GHOSH

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Personal information

Date of birth	12 June 1964	Sex	Male
Nationality	Indian; Norwegian permanent resident (qualifies as European nominee)		
ORCID	0000-0003-1161-6364	ResearcherID	G-8164-2016
Google Scholar	https://scholar.google.com/citations?user=hc3YyBIAAAAJ&hl=no&oi=ao		
Personal website	https://en.uit.no/forskning/forskningsgrupper/gruppe?p_document_id=349450		

Education

1987	B. Sc. (Honours), Department of Chemistry, Jadavpur University, India
1992	Ph. D., Department of Chemistry, University of Minnesota, USA, w/ Prof. Paul G. Gassman; <i>Thesis</i> : “X-ray Photoelectron Spectroscopic and <i>Ab Initio</i> Computational Study of Substituent Effects in Tetrapyrroles.”

Employment

2000-present	Professor of chemistry, UiT – The Arctic University of Norway
1996-2000	Associate Professor of chemistry, UiT – The Arctic University of Norway
1995-1996	Research Associate, University of California, Riverside, w/ Prof. David F. Bocian
1992-1995	Postdoctoral Associate, Univ. of Minnesota, Minneapolis, w/ Prof. Lawrence Que, Jr.

Project management experience (selected; RCN = Research Council of Norway)

Year	Project; funding	Funder	Role
2021-2025	UiT Center for Sustainable STEM Education; 2 MNOK core funding	UiT	Director
2021-2025	Synchrotron-assisted design of cancer phototherapeutics; 12 MNOK	RCN	PI
2017-2022	Metalloporphyrins for photodynamic therapy and bioimaging; 10 MNOK	RCN	PI
2017-present	Multiple large beam time grants at Advanced Light Source, Lawrence Berkeley National Laboratory (LBNL)	US DOE, LBNL	PI
2015-present	Multiple large beam time grants at the Stanford Synchrotron Radiation Lightsource (SSRL), SLAC National Accelerator Laboratory	US DOE, SLAC	PI
2014-2017	Corroles as a platform for fundamental transition metal chemistry, with emphasis on heavy elements; 10 MNOK	RCN	PI
2015-2017	Metalloporphyrins for catalysis and biophotonics; large grant of beam time at Advanced Light Source, LBNL	US DOE, LBNL	PI
2007-2017	Center for Theoretical and Computational Chemistry; work package leader in national Center of Excellence; responsible for 12 MNOK	RCN	Co-PI
2011-2014	<i>In-silico</i> design and mechanistic studies of clean-energy materials; an India-Norway collaborative project; 3 MNOK	RCN	PI
2008-2013	Corroles as functional materials; 8 MNOK	RCN	PI

Institutional responsibilities: teaching and administration

1996-present	Supervised 16 PhD students, 14 postdocs, 12 master's thesis students, and >50 undergraduate researchers. See: https://academic-tree.org/chemistry/tree.php?pid=718107
2021-2025	Coordinator/Director, UiT Center for Sustainable STEM Education (UiT's flagship initiative in the area of science education)
2021-present	Member of the Board, Arctic Center for Sustainable Energy, UiT
2020-2022	Member, Committee on diversity and inclusion at Faculty of Science and Technology, UiT
2020-present	Member, Departmental Advisory Board, Department of Chemistry, UiT
2004-2019	Head, Division of Inorganic and Materials Chemistry, Department of Chemistry, UiT
1998-2020	Advised over > 15 UiT undergraduate research students & > 20 Erasmus/international exchange students, with > 15 coauthored publications
2004-2021	Current courses: <i>Introductory inorganic chemistry</i> ; <i>Bioinorganic chemistry</i>
1996-2021	Special topics: <i>Advanced inorganic chemistry</i> (graduate); <i>stereochemistry</i> (graduate); <i>supramolecular chemistry</i> (graduate); <i>fluorine chemistry</i> (graduate); medicinal inorganic chemistry (graduate);

Service/commissions of trust

Year	Description - Role
2022	Edited a Virtual Issue " Out in Inorganic Chemistry: A Celebration of LGBTQIAPN+ Inorganic Chemists " encompassing <i>Inorganic Chemistry</i> and other ACS journals
2007-present	Member, Editorial Advisory Board, <i>Journal of Inorganic Biochemistry</i>
2000-present	Member, Editorial Advisory Board, <i>Journal of Porphyrins and Phthalocyanines</i>
1999-present	International advisory board, <i>International Conference on Porphyrins and Phthalocyanines</i>
2011	Edited a guest section on " Ab initio wavefunctions in bioinorganic chemistry: More than a succès d'estime? " in the <i>Journal of Biological Inorganic Chemistry</i>
2009	Edited a special issue " Theory and computing in contemporary coordination chemistry " in <i>Coordination Chemistry Reviews</i>
2006	Edited a special issue " Heme–diatomic interactions: across time, taxa, and disciplines " in the <i>Journal of Inorganic Biochemistry</i>
2005	Edited a special issue " High-valent iron intermediates in biology " in <i>J. Inorg. Biochem</i>
2001	Edited a special issue " 1950–2000: Fifty years of theoretical research on porphyrins " in the <i>Journal of Porphyrins and Phthalocyanines</i>
1999-2001, 2005-2007	Member, Editorial Advisory Board, <i>Journal of Biological Inorganic Chemistry</i>
2001-2003	Guest editor, a three-part series on "Computational Bioinorganic Chemistry" in <i>Current Opinion in Chemical Biology</i> . Part 1: https://doi.org/10.1016/S1367-5931(01)00270-8

Publication statistics

> **260** peer-reviewed research publications, including > 95% as corresponding author.

~**11,000** cites (Google Scholar); > **9500** (Publons)

H-index: **61** (Google Scholar); **55** (Publons)

Ten influential publications

1. Ghosh, A. [Substituent Effects on Valence Ionization Potentials of Free Base Porphyrins: A Local Density Functional Study](#). *J. Am. Chem. Soc.* **1995**, *117*, 4691–4699. Early demonstration of near-quantitative performance of DFT in reproducing gas-phase photoelectron spectra and ionization potentials of porphyrin-type molecules.
2. Ghosh, A.; Bocian, D. F. [Carbonyl Tilting and Bending Potential Energy Surface of Carbon Monoxyhemes](#). *J. Phys. Chem.* **1996**, *100*, 6363–6367.
3. Ghosh, A.; Wondimagegn, T.; Parusel, A. B. J. [Electronic Structure of Gallium, Copper, and Nickel Complexes of Corrole. High-Valent Transition Metal Centers versus Noninnocent Ligands](#). *J. Am. Chem. Soc.* **2000**, *122*, 5100–5104. First first-principles study of corroles and first prediction of noninnocent/radical character in metallocorroles.
4. Thomas, K. E.; Alemayehu, A. B.; Conradie, J.; Beavers, C.; Ghosh, A. [Synthesis and Molecular Structure of Gold Triarylcorroles](#). *Inorg. Chem.* **2011**, *50*, 12844–12851. General method for gold insertion into corroles; now the method of choice in the corrole community.
5. Alemayehu, A. B.; Gagnon, K. J.; Turner, J.; Ghosh, A. [Oxidative Metalation as a Route to Size-Mismatched Macrocyclic Complexes: Osmium Corroles](#). *Angew. Chem. Int. Ed.* **2014**, *53*, 14411-14414. First synthesis of Os corroles. A follow-up paper reported triple-bonded Os corrole dimers. Osmium corroles are still unique to the Ghosh laboratory.
6. Alemayehu, A. B.; Jae Day, N. U.; Mani, T.; Rudine, A. B.; Thomas, K. E.; Gederaas, O. A.; Vinogradov, S. A.; Wamser, C. C.; Ghosh, A. [Gold Tris\(carboxyphenyl\)corroles as Multifunctional Materials: Room Temperature Near-IR Phosphorescence and Applications to Photodynamic Therapy and Dye-Sensitized Solar Cells](#). *ACS Appl. Mater. Interfaces* **2016**, *8*, 18935-18942.
7. Thomas, K. E.; McCormick, L. J.; Vazquez-Lima, H.; Ghosh, A. [Stabilization and Structure of the cis Tautomer of a Free-Base Porphyrin](#). *Angew. Chem. Int. Ed.* **2017**, *56*, 10088-10092. First isolation of the long-sought *cis* tautomer of a free-base porphyrin, subsequently leading to a general strategy for the synthesis and isolation of such tautomers.
8. Ganguly, S.; McCormick, L. J.; Conradie, J.; Gagnon, K. J.; Sarangi, R.; Ghosh, A. [Electronic Structure of Manganese Corroles Revisited: X-ray structures, Optical and X-ray Absorption Spectroscopies, and Electrochemistry as Probes of Ligand Noninnocence](#). *Inorg. Chem.* **2018**, *57*, 9656-9669. Definitive, multitechnique characterization of ligand noninnocence in MnCl and Mn-aryl corroles.
9. Alemayehu, A.; McCormick-McPherson, L. J.; Conradie, J.; Ghosh, A. [Rhenium Corrole Dimers: Electrochemical Insights into the Nature of the Metal–Metal Quadruple Bond](#). *Inorg. Chem.* **2021**, *60*,

8315–8321. First example of quadruple-bonded metallocorrole dimers. Also one of the first, direct measurements of the electrochemical reduction of a quadruple bond.

10. Phung, Q. M.; Muchammad, Y.; Yanai, T.; Ghosh, A. [A DMRG/CASPT2 Investigation of Metallocorroles: Quantifying Ligand Noninnocence in Archetypal 3d and 4d Element Derivatives](#). *JACS Au* **2021**, *1*, 2303–2314. State-of-the-art *ab initio* analysis of the major classes of noninnocent metallocorroles, including multiple quantitative metrics of noninnocence and a ranking of the systems in question in order of noninnocent character.

Ten invited lectures at international conferences and workshops

- (1) Ghosh, A. “5d Metallocorroles: Synthesis and molecular structures of Os, Pt and Au corroles,” *8th Intl. Conf. on Porphyrins & Phthalocyanines*, Istanbul Turkey, June 22-27, 2014.
- (2) Ghosh, A.; Alemayehu, A.; Thomas, K. E. “Metal-Ligand Misfits: Squeezing 5d Elements into Corroles,” *17th Intl. Conf. on Biological Inorganic Chemistry*, Beijing, July 20-24, 2015.
- (3) Ghosh, A. “Pentafluorosulfanyl-appended porphyrins and corroles,” *21st Intl. Symposium on Fluorine Chemistry*, 23-28 August, 2015, Como, Italy.
- (4) Ghosh, A. “The taco and the pancake: Structural and spectroscopic signatures of ligand noninnocence in metallocorroles,” symposium on *Accessing the Full Potential of Redox-Active Ligands: Reactivity and Applications*, Pacificchem 2015, Honolulu, Hawaii, December 15-20, 2015.
- (5) Ghosh, A. “Comparative studies of 4d and 5d metallocorroles: New Tc^VO and Ru^{VI}N corroles,” *9th Intl. Conf. on Porphyrins & Phthalocyanines*, June 22-27, 2016, Nanjing, P. R. China.
- (6) Ghosh, A. “Ligand Noninnocence in Metallocorroles: Insights from Optical and X-ray Absorption Spectroscopies,” *Theoretical Models of Chemical Bonding & Reactivity Spanning the Periodic Table: A Symposium in Honor of Roald Hoffmann, 254th ACS Natl. Mtng.*, Washington, D. C., August 20, 2017.
- (7) Ghosh, A. “Ligand Noninnocence in Metallocorroles: Contributions from X-ray Absorption Spectroscopy,” *10th Intl. Conf. on Porphyrins & Phthalocyanines*, Munich, Germany, July 1-6, 2018.
- (8) Ghosh, A. “Phosphorescent 5d Metallocorroles: New Materials for Solar Cells and Photodynamic Therapy,” *23rd European Conf. on Organometallic Chemistry*, Helsinki, June 16-20, 2019.
- (9) Ghosh, A. “Seven Clues to Ligand Noninnocence,” given as principal instructor at *Graduate Research Seminar* (~ 50 attendees) of the *Danish Chemical Society*, University of Southern Denmark, April 24, 2019.
- (10) Ghosh, A. “Heavy Element Corroles: Size-Mismatched yet Robust Constructs for Imaging and Therapy,” *19th Intl. Conference on Biological Inorganic Chemistry*, Interlaken, Switzerland, August 11-16, 2019.

Books and monographs

- (1) Ghosh, A., Editor, [The Smallest Biomolecules: Diatomics and their Interactions with Heme Proteins](#). Elsevier, 2008, pp 1-603. *Multi-author monograph*.
- (2) Ghosh A., Editor, [Letters to a Young Chemist](#). Wiley, 2011, pp 1-298. *Popular book on careers in chemistry research*.
- (3) Ghosh, A.; Berg, S. [Arrow Pushing in Inorganic Chemistry: A Logical Approach to the Chemistry of the Main Group Elements](#). Wiley, 2014, pp 1-311. **Won Best Textbook PROSE award; see below**.

Recent review articles and/or book chapters (selected)

- (1) Ghosh, A. [Electronic Structure of Corrole Derivatives: Insights from Molecular Structures, Spectroscopy, Electrochemistry, and Quantum Chemical Calculations](#). *Chem. Rev.* **2017**, *117*, 3798-3881.
- (2) Ganguly, S.; Ghosh, A. [Seven Clues to Ligand Noninnocence: The Metallocorrole Paradigm](#). *Acc. Chem. Res.* **2019**, *52*, 2003–2014.
- (3) Alemayehu, A. B.; Thomas, K. E.; Einrem, R. F.; Ghosh, A. [The Story of 5d Metallocorroles: From Metal-Ligand Misfits to New Building Blocks for Cancer Phototherapeutics](#). *Acc. Chem. Res.* **2021**, *54*, 3095–3107.

Popular science, chemical education, and outreach (selected)

- (1) Berg, S.; Ghosh, A. [Six Impossible Mechanisms Before Breakfast: Arrow Pushing as an Instructional Device in Inorganic Chemistry](#). *J. Chem. Educ.* **2013**, *90*, 1446-1451.
- (2) Ghosh, A.; Kiparsky, P. [The grammar of the elements: Did the Sanskrit alphabet influence the construction of Mendeleev’s periodic table?](#) *American Scientist*, **2019**, *107*, 350-355. See also *American Scientist’s most popular article in 2019* and comment in *C&E News: A linguistic homage and musical elements*.
- (3) Ghosh, A. [An Exemplary Gay Scientist and Mentor: Martin Gouterman \(1931-2020\)](#). *Angew. Chem. Int. Ed.* **2021**, *60*, 9760-9770. For a shorter account, published on LGBTSTEMDay 2020, see: Ghosh, A. [Martin Gouterman: the gay man behind the four-orbital model](#). *ChemistryWorld* **2020** (December), 36-37.

Awards and honors (selected)

Year	Description
2022	Hans Fischer Career Award for Lifetime Achievement in Porphyrin Chemistry
2022	Elected Fellow of the European Academy of Sciences (Brussels)
2022	Teaching Award of UiT's Faculty of Science and Technology Student Association
2022	Elected Fellow of Academia Borealis, Northern-Norwegian Academy of Sciences and Letters
2021	UiT's Research and Development Prize, "FoU-prisen"
2020	UiT's Prize for Basic Research, "Grunnforskningsprisen"
2019	Christmas and Centenary Lecturer of the Finnish Chemical Society, Helsinki
2018	Fellow of the Royal Society of Chemistry (FRSC)
2015	Association of American Publishers Awards for Professional and Scholarly Excellence (PROSE Award) for Best Textbook in Physical Sciences and Mathematics published in 2014
2013-2018	Visiting Professor, Portland State University, Portland, OR, USA; stays totaling 4 months
2006-2014	Visiting Professor, The University of Auckland, New Zealand; stays totaling 18 months
2004-2010	Outstanding Younger Researcher Awardee of the Research Council of Norway
1997-2004	Senior Fellow, San Diego Supercomputer Center, University of California San Diego
1987	University Medal for first rank (based on GPA) in B. Sc. (Hons.) at Jadavpur University, India

Career development of students and peers

- Currently: mentor to 3 junior faculty at the Faculty of Science and Technology at UiT
- Former PhD students and postdocs in permanent academic positions: 8 including 6 males and 2 females; in high-level industrial positions: 8
- Instrumental in appointing 3 distinguished, female Professors II at the Department of Chemistry, UiT
- Broad network of female and LGBTQ+ collaborators, including 10 whom I have assisted with finding a permanent academic position and/or with promotion
- Assisted scholars from disadvantaged national/ethnic backgrounds, incl. > 10 from Africa, Latin America, Iran, and the Palestinian territories, with finding academic positions, promotion, tenure, etc.

Selected collaborators

Collaborator	Affiliation	Area of collaboration
Prof. Roger Alberto	University of Zurich, Switzerland	^{99m} Tc radiopharmaceuticals
Prof. Jesper Bendix	University of Copenhagen, Denmark	High-field EPR spectroscopy
Prof. Sergey Borisov	Graz University of Technology, Austria	Photophysical studies
Prof. Penny Brothers	Univ. of Auckland, New Zealand	Main-group chemistry
Prof. Jeanet Conradie	Univ. Free State, South Africa	Quantum chemical modeling
Dr. Cina Foroutan-Nejad	Polish Academy of Sciences, Warsaw	Quantum chemical modeling
Dr. Odrun Gederaas	St. Olavs Hospital, NTNU, Norway	Photodynamic therapy
Prof. Claude Gros	Université de Bourgogne, France	Porphyrin analogue ligands
Prof. Todd Harrop	University of Georgia, Athens	Metal-NO chemistry
Prof. Hiroshi Imahori	University of Kyoto, Japan	Dye-sensitized solar cells
Dr. Jurek Krzystek	National High Magnetic Field Lab., Florida, USA	High-field EPR
Prof. Karl Kadish	University of Houston, USA	Electrochemistry
Prof. Mikael Lindgren	Norwegian University of Science and Technology	Photophysical studies
Prof. Stephen J. Lippard	Massachusetts Institute of Technology	NO/HNO chemistry
Prof. Kristine Pierloot	Katholieke Universiteit Leuven, Belgium	Quantum chemical modeling
Dr. Simon Teat	Advanced Light Source, Lawrence Berkeley Natl. Lab.	X-ray crystallography
Dr. Ritimukta Sarangi	Stanford Synchrotron Radiation Lightsource (SSRL)	XAS, XES, RIXS, etc.
Dr. Alexander Schnegg	BESSY II – Helmholtz-Zentrum Berlin, Germany	FD FT THz-EPR
Prof. Joshua Telser	Roosevelt University, USA	High-field EPR spectroscopy
Prof. Zachary Tonzetich	University of Texas San Antonio, USA	Porphyrinoid synthesis
Prof. Akira Yamakata	Toyota Technological Institute, Japan	Ultrafast spectroscopy
Prof. Carl Wamser	Portland State University, USA	Dye-sensitized solar cells