

# CURRICULUM VITAE

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## Saurabh S. Chitnis

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Department of Chemistry  
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## Education & Training

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1. PDF, Douglas Stephan, University of Toronto, Toronto ..... 2017–2018
2. PDF, Ian Manners, University of Bristol, Bristol ..... 2015–2017
3. PhD (*summa cum laude*), Neil Burford, University of Victoria, Victoria ..... 2010–2015
4. BSc (*summa cum laude*), Gary Schrobilgen, McMaster University, Hamilton ..... 2006–2010

## Honours

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1. Highlighted in Chemical Communications ‘Emerging Investigators’ Issue ..... 2020
2. Highlighted in Dalton Transactions ‘New Talent: Americas’ Issue ..... 2020
3. Lindau Nobel Laureate Meeting Participant ..... 2017
4. Governor General’s Gold Medal ..... 2017
5. York Postdoctoral Fellowship (Declined) ..... 2017–2019
6. Banting Postdoctoral Fellowship ..... 2015–2017
7. NSERC Postdoctoral Fellowship (Declined) ..... 2015–2017
8. Vanier Canada Graduate Scholarship ..... 2012–2015
9. NSERC Canada Graduate Scholarship - D3 (Declined) ..... 2012–2015
10. NSERC Canada Graduate Scholarship - M ..... 2011

## Research Funding (Independent Career)

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1. American Chemical Society Petroleum Research Fund (PRF): \$ 141,000 CAD ..... 2021–2023
2. NSERC Discovery Grant (DG): \$ 170,000 CAD ..... 2018–2023
3. CFI John Evans Leaders Fund (JELF): \$ 250,000 CAD ..... 2018
4. Dalhousie Startup Funding: \$ 130,000 CAD ..... 2018

## Research Funding Under Review

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1. NSERC Research Tools & Instruments: \$ 100,000 CAD (Principal Applicant, with 6 co-applicants) ..... 2021

## Teaching Experience

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1. CHEM 2301: Physical Chemistry I ..... Fall 2021
2. CHEM 6155: Topics in Main Group Chemistry ..... Fall 2020
3. CHEM 4101/5101: Advanced Main Group Chemistry ..... Winter 2020
4. CHEM 1011: Concepts in Chemistry ..... Winter 2019

## Students Supervised

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### Current:

1. Joseph Bedard: PhD candidate ..... 01/2020–
2. Katherine Marczenko: PhD candidate ..... 09/2018–
3. Toren Hynes: MSc candidate ..... 01/2021–
4. Samantha Jee: BSc Hons. candidate ..... 09/2020–
5. Steve Sequeira: BSc Hons. candidate ..... 09/2020–

### Alumni:

6. Warren VandeVen: Undergraduate Inorganic Chemistry Exchange Summer Student ..... 06/2020–08/2020
7. Toren Hynes:
  - Undergraduate Summer Student ..... 05/2019–08/2019
  - BSc Hons. ..... 09/2019–04/2020
  - Volunteer ..... 07/2020–12/2020
8. Marcus B. Kindervater: MSc ..... 09/2018–08/2020
9. Nicholas Roberts: Undergraduate Volunteer ..... 03/2019–03/2020
10. Nicholas Murphy: Undergraduate Volunteer ..... 01/2020–03/2020
11. Junyi Li: Undergraduate Volunteer ..... 09/2019–03/2020
12. Joshua MacMillan:
  - Undergraduate Summer Student ..... 05/2019–09/2019
  - BSc Hons. ..... 09/2019–04/2020
13. Samantha Jee:
  - Undergraduate Summer Student ..... 05/2019–09/2019
  - Experiential Learning Student ..... 09/2019–12/2020
  - Volunteer ..... 01/2020–03/2020
14. Joseph A. Zurakowski: Undergraduate Inorganic Chemistry Exchange Summer Student ..... 05/2019–08/2019
15. Fatemeh Shahriari: Undergraduate Experiential Learning Student ..... 09/2019–12/2020
16. Chloe-Louise Johnson: BSc Hons. ..... 09/2018–04/2019
17. Ciaran Crouse: Undergraduate Summer Student ..... 07/2018–08/2018
18. Jessica Albert: Undergraduate Summer Student ..... 07/2018–08/2018

## Service

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1. 'Global Inorganic Discussion Weekday' – Online Symposium Co-Founder and Organizer ..... 2020–
2. Grant Reviewing: NSERC DG, CFI JELF, US-Israel Binational Science Fund, ACS PRF ..... 2019–
3. NSERC Collaborate Research And Training Experience (CREATE) National Panel ..... 2021–
4. NSERC Canada Graduate Scholarship & Harmonized Scholarship Process University Review Committee ..... 2019–
5. Department of Chemistry Graduate Students Committee ..... 2018–
6. Faculty of Science Nominations Committee ..... 2018–
7. 'Inorganic Chemistry Exchange' – Undergraduate Research Symposium Organizer ..... 2020

## Peer-Reviewed Publications

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### Independent Career:

1. T. Hynes, S. S. Chitnis\*, 'Antimony and Bismuth Complexes in Organic Synthesis', Comprehensive Organometallic Chemistry, Elsevier Science Reference Book, **2020**, In Press. (*Invited Book Chapter*)
2. K. M. Marczenko, S. S. Chitnis\*, 'Aminobismuthination of CO<sub>2</sub>', ChemRxiv, **2021**, Preprint. (Communication)
3. J. W. M. MacMillan, K. M. Marczenko, E. R. Johnson\*, S. S. Chitnis\*, 'Hydrostibination of acetylenes: A radical mechanism', Chem. Eur. J., **2020**, *26*, 17134–17142. (Full Paper, *Selected by Editors as 'Hot Paper'*)
4. K. M. Marczenko, S. S. Chitnis\*, 'Bismuthanylstibanes', Chem. Commun., **2020**, *56*, 8015–8018. (Communication, *Invited contribution to the 2020 Emerging Investigators Issue*)
5. K. M. Marczenko, S. Jee, S. S. Chitnis, 'High Lewis acidity at planar, trivalent, neutral, bismuth centres', Organometallics, **2020**, *39*, 4287–4296. (Full Paper, *Invited contribution to the 2020 Main Group Elements special issue*)
6. M. W. Drover\*, S. S. Chitnis\*, 'So you want to develop a virtual lecture series? Lessons learned from the Global Inorganic Discussion Weekday (GIDW) – a Canadian initiative', Can. J. Chem., **2020**, *98*, 737–740. (Full Paper, *Invited Perspective*)
7. M. B. Kindervater, T. Hynes, K. M. Marczenko, S. S. Chitnis\*, 'Squeezing Bi: PNP and P<sub>2</sub>N<sub>3</sub> Pincer Complexes of Bismuth(III)', Dalton Trans., **2020**, *46*, 16072–16076. (Communication, *Invited contribution to the 2020 New Talent: Americas Issue*)
8. K. M. Marczenko, J. A. Zurakowski, K. L. Bamford, J. W. M. MacMillan, S. S. Chitnis\*, 'Hydrostibination', Angew. Chem. Int. Ed., **2019**, *58*, 18096–18101. (Full Paper)
9. K. M. Marczenko, J. A. Zurakowski, M. B. Kindervater, S. Jee, T. Hynes, N. Roberts, S. Park, U. Werner-Zwanziger, M. Lumsden, D. N. Langelaan, S. S. Chitnis\*, 'Periodicity in Structure, Bonding, and Reactivity for P-Block Complexes of a Geometry-Constraining Triamide Ligand', Chem. Eur. J., **2019**, *25*, 16414–16424. (Full Paper)
10. K. M. Marczenko, C. L. Johnson, S. S. Chitnis\*, 'Synthesis of a Perfluorinated Phenoxyphosphorane and Conversion to its Hexacoordinate Anions', Chem. Eur. J., **2019**, *25*, 8865–8874. (Full Paper)
11. M. Kindervater, K. M. Marczenko, U. Werner-Zwanziger, S. S. Chitnis\*, 'A redox-confused Bi<sup>(I/III)</sup> tris-amide with a T-shaped planar ground state', Angew. Chem. Int. Ed., **2019**, *58*, 7850–7855. (Communication)

### Training:

12. A. Waked, S. S. Chitnis, D. Stephan, 'P(V) Dications: Carbon-based Lewis acid initiators for Hydrodefluorination', Chem. Commun., **2019**, *55*, 8971–8974.
13. A. Knights, S. S. Chitnis, I. Manners, 'Photolytic, Radical-Mediated Hydrophosphination: A Convenient Post-Polymerisation Modification Route to P-Di(organosubstituted) Polyphosphinoboranes [RR'PBH<sub>2</sub>]<sub>n</sub>', Chem. Sci., **2019**, *10*, 7281–7289.
14. R. J. Andrews, S. S. Chitnis, D. W. Stephan, 'Carbonyl and olefin hydrosilylation mediated by an air-stable phosphorus(III) dication under mild conditions', Chem. Commun., **2019**, *55*, 5599–5602.
15. N. Oldroyd, S. S. Chitnis, V. T. Annibale, M. Arz, H. A. Sparkes, I. Manners, 'Metal-free dehydropolymerisation of phosphine-boranes using cyclic (alkyl)(amino)carbenes as hydrogen acceptors', Nature Comm., **2019**, *10*, 1370.
16. M. Xu, A. R. Jupp, M. S. E. Ong, K. I. Burton, S. S. Chitnis, D. W. Stephan, 'Synthesis of Urea Derivatives from CO<sub>2</sub> and Silylamines', Angew. Chem. Int. Ed., **2019**, *58*, 5707–5711.
17. S. S. Chitnis, J. H. W. LaFortune, H. Cummings, L. L. Liu, R. Andrews, D. W. Stephan, 'Phosphorus Coordination Chemistry in Catalysis: Air Stable P(III) Dications as Lewis Acids for the Allylation of C-F Bonds', Organometallics, **2018**, *37*, 4540–4544. (Cover Article)
18. S. S. Chitnis, F. Krischer, D. W. Stephan, 'Catalytic hydrodefluorination of C–F bonds by an air-stable P(III) Lewis acid', Chem. Eur. J., **2018**, *24*, 6543–6546.

19. K. Bamford, S. S. Chitnis, Z. Qu, D. W. Stephan, 'Interactions of CF Bonds with Hydridoboranes: Reduction, Borylation and Friedel–Crafts Alkylation', Chem. Eur. J., **2018**, *24*, 16014-16018.
20. L. Wu, S. S. Chitnis, J. Haijun, V. T. Annibale, I. Manners, 'Non-Metal Catalysed Heterodehydrocoupling of Phosphines and Hydrosilanes: Mechanistic Studies of B(C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>-Mediated Formation of P-Si Bonds', J. Am. Chem. Soc., **2017**, *139*, 16780-16790.
21. S. S. Chitnis, H. A. Sparkes, N. E. Pridmore, V. T. Annibale, A. M. Oliver and I. Manners, 'Addition of a Cyclophosphine to Nitriles: An Inorganic 'Click' Reaction Featuring Protio-, Organo-, and Main Group Catalysis', Angew. Chem. Int. Ed., **2017**, *56*, 9536-9540. Highlighted in CEN. Highlighted in SYNFACTS.
22. S. S. Chitnis, R. A. Musgrave, H. A. Sparkes, N. E. Pridmore, V. T. Annibale, and I. Manners, 'Influence of Ring Strain and Bond Polarization on the Ring Expansion of Phosphorus Homocycles', Inorg. Chem., **2017**, *56*, 4521-4537
23. S. S. Chitnis, K. Vos, N. Burford, R. McDonald, and M. J. Ferguson, 'Distinction Between Coordination and Phosphine Ligand Oxidation: Interactions of Di- and Tri-phosphines with Pn<sup>3+</sup> (Pn = P, As, Sb, Bi)', Chem. Commun., **2016**, 685-688.
24. K. L. Bamford, S. S. Chitnis, R. L. Stoddard, J. S. McIndoe, and N. Burford, 'Bond Fission in Monocations: Diverse Fragmentation Pathways for Phosphinophosphonium Cations', Chem. Sci., **2016**, *7*, 2544-2552.
25. S. Yogendra, S. S. Chitnis, F. Hennesdorf, M. Bodensteiner, R. Fischer, N. Burford, and J. J. Weigand, 'Condensation Reactions of Chlorophosphanes with Chalcogenides', Inorg. Chem., **2016**, *55*, 1854-1860.
26. A. P. M. Robertson, S. S. Chitnis, S. Chhina, H. J. Cortes, B. O. Patrick, H. A. Jenkins, and N. Burford, 'Complexes of Trimethylsilyl Trifluoromethanesulfonate with Nitrogen, Oxygen and Phosphorus Donors', Can. J. Chem., **2016**, *94*, 424-429.
27. S. S. Chitnis, A. P. M. Robertson, N. Burford, B. O. Patrick, R. McDonald, and M. J. Ferguson, 'Bipyridine Complexes of E<sup>3+</sup> (E = P, As, Sb, Bi): Strong Lewis Acids, Sources of E(OTf)<sub>3</sub> and Synthons for E<sup>I</sup> and E<sup>V</sup> Cations', Chem. Sci., **2015**, *6*, 6545-6555.
28. S. S. Chitnis, N. Burford, J. J. Weigand, and R. McDonald, 'Reductive Catenation of Phosphine-Antimony Complexes', Angew. Chem. Int. Ed., **2015**, *54*, 7828-7832.
29. S. S. Chitnis, A. P. M. Robertson, N. Burford, J. J. Weigand, and R. Fischer, 'Synthesis and Reactivity of *Cyclo*-tetra (stib-inophosphonium) Tetracations: Redox and Coordination Chemistry of Phosphine-Antimony Complexes', Chem. Sci., **2015**, *6*, 2559-2574.
30. A. P. M. Robertson, S. S. Chitnis, H. Jenkins, R. McDonald, M. J. Ferguson, and N. Burford, 'Establishing the Coordination Chemistry of Antimony(V) Cations: Systematic Assessment of Ph<sub>4</sub>Sb(OTf) and Ph<sub>3</sub>Sb(OTf)<sub>2</sub> as Lewis Acceptors', Chem. Eur. J., **2015**, *21*, 7902-7913.
31. S. S. Chitnis, and N. Burford, 'Phosphine complexes of lone-pair bearing acceptors', Dalton Trans., **2015**, *44*, 17-29.
32. S. S. Chitnis, M. Whalen, and N. Burford, 'Influence of Charge and Coordination Number on Bond Dissociation Energies, Distances and Vibrational Frequencies for the Phosphorus-Phosphorus Bond', J. Am. Chem. Soc., **2014**, *136*, 12498-12506.
33. S. S. Chitnis, N. Burford, R. McDonald, and M. J. Ferguson, 'Prototypical Phosphine Complexes of Antimony(III)', Inorg. Chem., **2014**, *53*, 5359-5372.
34. S. S. Chitnis, N. Burford, A. Decken, and M. J. Ferguson, 'Coordination Complexes of Bismuth Triflates with THF and Diphosphine Ligands', Inorg. Chem., **2013**, *52*, 7242-7248.
35. S. S. Chitnis, Y-Y. Carpenter, N. Burford, R. McDonald and M. J. Ferguson, 'Assembly of a *cyclo*-tetrastibino-tetraphosphonium Tetracation by Reductive Elimination', Angew. Chem. Int. Ed., **2013**, *52*, 4863-4866.
36. S. S. Chitnis, N. Burford, and M. J. Ferguson, '2,2-Bipyridine Complexes of Antimony: Sequential Fluoride Ion Abstraction from SbF<sub>3</sub> by Exploiting the Fluoride Ion Affinity of Me<sub>3</sub>Si<sup>+</sup>', Angew. Chem. Int. Ed., **2013**, *52*, 2042-2045.
37. E. MacDonald, L. Doyle, S. S. Chitnis, U. Werner-Zwanziger, N. Burford, and A. Decken, 'Me<sub>3</sub>P Complexes of P-block Lewis Acids SnCl<sub>4</sub>, [SnCl<sub>3</sub>]<sup>1+</sup>, and [SnCl<sub>2</sub>]<sup>2+</sup>', Chem. Commun., **2012**, *48*, 7922-7924.

38. S. S. Chitnis, E. MacDonald, N. Burford, U. Werner-Zwanziger, and R. McDonald, 'P-P Menshutkin Preparation of Prototypical Phosphinophosphonium Salts', *Chem. Commun.*, **2012**, 48, 7359-7361.
39. S. S. Chitnis, B. Peters, E. Conrad, N. Burford, R. McDonald, and M. J. Ferguson, 'Structural Diversity for Phosphine Complexes of Stibonium and Stibinidenium Cations', *Chem. Commun.*, **2011**, 47, 12331-12333.
40. F. Lollmahomed, W. J. Leigh, L. A. Huck, S. S. Chitnis, and C. R. Harrington, 'Time-Resolved Spectroscopic Studies of the Reactivities of Transient Germylenes in Methanol and Tetrahydrofuran Solution', *Organometallics*, **2009**, 28, 1484-1494.

## Presentations

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### Independent Career:

1. 'Hydrostibination – Discovery, Mechanism, & Application' – Canadian Chemistry Conference and Exhibition, **2021**, Montreal.
2. 'Heavy p-block hydrides: Taming the Sb-H bond for new reactivity and catalysis' – Tel Aviv University, Oct 25, **2020**.
3. 'Distant Cousins - Exploring the Group 13/15 Diagonal Relationship' – McGill University, Sept 20, **2020**.
4. 'Geometric tuning of electronic structure, reactivity, and bonding at Bi and Sb centres' – Main Group Seminar Series - Royal Society of Chemistry Online Webinar, April 04, **2020**.
5. 'Bis(silyl)naphthalenediamines as bespoke ligands for isolating fragile bonds' – Canadian Chemistry Conference and Exhibition, Winnipeg, **2020**. (Conference cancelled due to COVID-19 pandemic)
6. 'A mechanistic proposal for hydrostibination' – Canadian Chemistry Conference and Exhibition, Winnipeg, **2020**. (Conference cancelled due to COVID-19 pandemic)
7. 'New bonds and reactivity at Bi and Sb centres' – Canadian Chemistry Conference and Exhibition, Winnipeg, **2020**. (Conference cancelled due to COVID-19 pandemic)
8. 'New electronic structure and reactivity at Sb and Bi centres' – University of Windsor, Windsor, Feb 14, **2020**.
9. 'New electronic structure and reactivity at Sb and Bi centres' – University of Winnipeg, Winnipeg, Oct 23, **2019**.
10. 'New electronic structure and reactivity at Sb and Bi centres' – University of Manitoba, Winnipeg, Oct 24, **2019**.
11. 'Orbital engineering of main group compounds for new reactivity' – Cape Breton University, Sydney, Oct 7, **2019**.
12. 'Orbital engineering of main group compounds for new reactivity' – University of Prince Edward Island, Charlottetown, Oct 4, **2019**.
13. 'Translational Main Group Chemistry – From Fundamental to Functional' – St. Mary's University, Halifax, October **2018**.
14. 'Translational Main Group Chemistry – From Fundamental to Functional' – Mt. Alison University, Sackville, November **2018**.
15. 'Translational Main Group Chemistry – From Fundamental to Functional' – University of New Brunswick - November **2018**.

### Training:

16. 'Heterolysis of Homoatomic Bonds between p-Block Elements: Catalytic Synthesis of Inorganic Rings and Polymers', – Gordon Stone Symposium, University of Bristol, Bristol, **2017**.
17. 'Catalytic Addition of P–P Bond to Nitriles and Isocyanides' – Canadian Society of Chemistry Conference, Toronto, **2017**.
18. 'Postpolymerization Functionalization of Polyphosphinoboranes' – Canadian Society of Chemistry Conference, Toronto, **2017**.

19. 'Ring-Opening and Ring-Expansion Chemistry of Strained Phosphacycles: Towards Polyphosphorus Polymers' – Symposium in honour of Matthias Driess, University of Bristol, Bristol, **2016**.
  20. 'Coordination Chemistry of E(OTf)<sub>3</sub> (E = P, As, Sb, Bi)' – Canadian Society of Chemistry Conference, Ottawa, **2015**.
  21. 'Synthesis and reactivity of phosphine-stabilized *catena*-antimony polycations' – American Chemical Society National Meeting, San Francisco, **2015**.
  22. 'Synthesis and Reactivity of highly-charged *catena*-Antimony cations' – Canadian Society of Chemistry Conference, Vancouver, **2014**.
  23. 'P-Sb Coordination Complexes' – Alberta/British Columbia Inorganic Discussion Weekend, Kelowna, **2013**.
  24. 'Formation of a cyclic Tetra-(stibinophosphonium) Tetracation: *cyclo*-[Me<sub>3</sub>PSb]<sub>4</sub><sup>4+</sup>' – Canadian Society of Chemistry Conference, Quebec City, **2013**.
  25. 'Synthesis and Reactivity of *cyclo*-[Me<sub>3</sub>PSb]<sub>4</sub><sup>4+</sup>' – Mitteldeutsches Anorganiker Nachwuchs Symposium, Dresden, **2013**.
  26. 'Prototypical phosphine complexes of [SbX<sub>n</sub>]<sup>(3-n)+</sup> (X = Halogen, n = 0, 1, 2, 3)' – Canadian Society of Chemistry Conference, Quebec City, **2013**.
  27. 'Structural diversity and reactivity of new phosphine-stabilized antimony centers' – Canadian Society of Chemistry Conference, Calgary, **2012**.
  28. 'Cationic Inter-Pnictogen Chemistry: Accessing Coordinate Bi-Pn and P-Sb bonds' – Atlantic Inorganic Discussion Weekend, Mactaquac, **2011**.
  29. 'Cationic Inter-Pnictogen Chemistry: Accessing rare interpnictogen bonds' – Canadian Society of Chemistry Conference, Montreal, **2011**.
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