

Curriculum Vitae

Prof. Dr. Máté J. Bezdek

PERSONAL INFORMATION

Citizenship: Canadian-Hungarian (Dual)
Birthdate: November 4, 1991
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EDUCATION

- 09/2014 – 06/2019 **Doctor of Philosophy, Inorganic Chemistry** (Advisor: Professor Paul J. Chirik)
Department of Chemistry, Princeton University, Princeton, NJ, USA
- Dissertation Title: “Interconversion of Ammonia with its Elements by Molybdenum Complexes: Fundamental Investigations”
 - Awarded the *Porter Ogden Jacobus Honorific Fellowship*, Princeton University’s Top Honor for Graduate Students
- 09/2010 – 06/2014 **Bachelor of Science, Chemistry**
Department of Chemistry, University of Calgary, Calgary, AB, Canada
- Honours Program; 4.0/4.0 GPA
- 09/2007 – 06/2010 **High School Diploma**
Notre Dame High School, Calgary, AB, Canada
- 1st of 391, Class Valedictorian

EMPLOYMENT

- 08/2021 – present **Assistant Professor (Tenure-Track)**, Functional Coordination Chemistry
Department of Chemistry and Applied Biosciences, ETH Zürich, Switzerland
- 07/2019 – 07/2021 **Postdoctoral Associate** (Advisor: Professor Timothy M. Swager)
Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA, USA

SUPERVISION OF EARLY-STAGE RESEARCHERS

- 2023 – present Aurelio Gasser (PhD)
- 2022 – present Sabrina Kleynemeyer (PhD), Yanlin Pan (PhD), Jan Reger (PhD)
- 2021 – present Daniel Käch (PhD), Lionel Wettstein (PhD)

TEACHING ACTIVITIES

- 2022 – present Inorganic Chemistry III: Organometallic Chemistry and Homogeneous Catalysis, *ETH Zürich*
- Bachelor's Degree Programme, Enrollment: 86 students (2022), 81 students (2023)

PANEL/BOARD MEMBERSHIPS, INDIVIDUAL REVIEWING ACTIVITIES

- 2024 – present Editorial Advisory Board Member, *Journal of the American Chemical Society*
- 2022 – present Early-Career Editorial Advisory Board Member, *Helvetica Chimica Acta*
- 2022 – present Steering Committee Member, ETH Molecular and Biomolecular Analysis Service (MoBiAS)
- 2018 – present Reviewer for journals including *J. Am. Chem. Soc.*, *Angew. Chem. Int. Ed.*, *Organometallics*, *Inorg. Chem.*, *Dalton Trans.*, *Helv. Chim. Acta*, *Sci. Rep.*
- 01/2020 – 01/2021 Contributor, Thieme Synfacts Editorial Team of Prof. Timothy M. Swager

ACTIVE MEMBERSHIPS IN SCIENTIFIC SOCIETIES

- 2021 – present Member, Swiss Chemical Society (SCS)
- 2013 – present Member, American Chemical Society (ACS)

SELECTED PRIZES, AWARDS AND FELLOWSHIPS

- 2024 Thieme Chemistry Journals Award
- 2021 MIT Research SLAM Winner, Postdoctoral Scholar Category
- 2020 American Chemical Society (ACS) Division of Inorganic Chemistry Young Investigator Award
- 2019 Elsevier Reaxys® Ph.D. Prize Finalist
- 2018 – 2019 Porter Ogden Jacobus Honorific Fellowship, Princeton University
- 2014 – 2019 Centennial Graduate Fellowship, Princeton University
- 2015 – 2018 Natural Sciences and Engineering Research Council of Canada (NSERC) Predoctoral Fellowship
- 2017 Third Year Seminar Hubbell '47 Prize, Princeton University
- 2014 Canadian Society of Chemical Industry Award
- 2013 DAAD Summer Undergraduate Research Fellowship, Technische Universität Kaiserslautern
- 2010 President's Entrance Scholarship, University of Calgary
- 2010 Governor General's Academic Medal
- 2008 Second Place Grand Award, Mathematical Science, Intel® International Science Fair

Independent career at ETH Zürich (* = Corresponding Author):

- 34) Käch, D.; Gasser, A.; Wettstein, L.; Schweinzer, C.; **Bezdek, M. J.*** “Phosphine Oxide-Functionalized Terthiophene Redox Systems.” *Angew. Chem. Int. Ed.* **2023**, e202304600. DOI: [10.1002/anie.202304600](https://doi.org/10.1002/anie.202304600).
 ▪ Selected as “Hot Paper”.
 ▪ Highlighted by [Chemistry World](#).

Prior to independent career:

- 33) Luo, S.-X. L.; Yuan, W.; Xue, M.; Feng, H.; **Bezdek, M. J.**; Palacios, T.; Swager, T. M. “Chemiresistive Hydrogen Sensing with Size-Limited Palladium Nanoparticles in Iptycene-Containing Poly(arylene ether)s.” *ACS Nano* **2023**, *17*, 2679–2688.
- 32) Li, J.; Yuan, W.; Luo, S.-L.; **Bezdek, M. J.**; Paire-Bueno, A.; Swager, T. M. “Wireless Lateral Flow Device for Biosensing.” *J. Am. Chem. Soc.* **2022**, *144*, 15786–15792.
- 31) **Bezdek, M. J.**; Luo, S.-X. L.; Liu, R. Y.; He, Q.; Swager, T. M. “Trace Hydrogen Sulfide Sensing Inspired by Polyoxometalate-Mediated Aerobic Oxidation.” *ACS Cent. Sci.* **2021**, *7*, 1572–1580.
- 30) **Bezdek, M. J.**; Luo, S.-X. L.; Ku, K. H.; Swager, T. M. “A Chemiresistive Methane Sensor.” *Proc. Natl. Acad. Sci. U.S.A.* **2021**, *118*, e2022515118.
- 29) **Bezdek, M. J.**; Pelczer, I.; Chirik, P. J. “Coordination-Induced N–H Bond Weakening in a Molybdenum Pyrrolidine Complex: Isotopic Labeling Provides Insight into the Pathway for H₂ Evolution.” *Organometallics* **2020**, *39*, 3050–3059.
- 28) Léonard, N. G.; Yruegas, S.; Ho, S. C.; Sattler, A.; **Bezdek, M. J.**; Chirik, P. J. “Synthesis of Cationic, Dimeric α -Diimine Nickel Hydride Complexes and Relevance to the Polymerization of Olefins.” *Organometallics* **2020**, *39*, 2630–2635.
- 27) Kim, S.; Loose, F.; **Bezdek, M. J.**; Wang, S.; Chirik, P. J. “Hydrogenation of N-Heteroarenes Using Rhodium Precatalysts: Reductive Elimination Leads to Formation of Multimetallic Clusters.” *J. Am. Chem. Soc.* **2019**, *141*, 17900–17908.
- 26) Léonard, N. G.; Palmer, W. N.; Friedfeld, M. R.; **Bezdek, M. J.**; Chirik, P. J. “Remote, Diastereoselective Cobalt-Catalyzed Alkene Isomerization–Hydroboration: Access to Stereodefined 1,3-Difunctionalized Indanes.” *ACS Catal.* **2019**, *9*, 9034–9044.
- 25) **Bezdek, M. J.**; Chirik, P. J. “A fresh approach to synthesizing ammonia from air and water.” *Nature* **2019**, *568*, 464–466.
- 24) **Bezdek, M. J.**; Chirik, P. J. “Pyridine(diimine) Chelate Hydrogenation in a Molybdenum Nitrido Ethylene Complex.” *Organometallics* **2019**, *38*, 1682–1687.
- 23) Zarate, C.; Yang, H.; **Bezdek, M. J.**; Hesk, D.; Chirik, P. J. “Ni(I)–X Complexes Bearing a Bulky α -Diimine Ligand: Synthesis, Structure and Superior Catalytic Performance in the Hydrogen Isotope Exchange of Pharmaceuticals.” *J. Am. Chem. Soc.* **2019**, *141*, 5034–5044.
- 22) Rafiq, S.; **Bezdek, M. J.**; Chirik, P. J.; Scholes, G. D. “Dinitrogen Coupling to a Terpyridine-Molybdenum Chromophore Is Switched on by Fermi Resonance.” *Chem* **2019**, *5*, 402–416.
- 21) Joannou, M. V.; Darmon, J. M.; **Bezdek, M. J.**; Chirik, P. J. “Exploring C(sp³)–C(sp³) reductive elimination from an isolable iron metallacycle.” *Polyhedron* **2019**, *159*, 308–317.
- 20) **Bezdek, M. J.**; Chirik, P. J. “Proton-Coupled Electron Transfer to a Molybdenum Ethylene Complex Yields a β -Agostic Ethyl: Structure, Dynamics and Mechanism.” *J. Am. Chem. Soc.* **2018**, *140*, 13817–13826.
- 19) Joannou, M. V.; **Bezdek, M. J.**; Chirik, P. J. “Synthesis and Reactivity of Reduced α -Diimine Nickel Complexes Relevant to Acrylic Acid Synthesis.” *Organometallics* **2018**, *37*, 3389–3393.
- 18) Rafiq, S.; **Bezdek, M. J.**; Koch, M.; Chirik, P. J.; Scholes, G. D. “Ultrafast Photophysics of a Dinitrogen Bridged Molybdenum Complex.” *J. Am. Chem. Soc.* **2018**, *140*, 6298–6307.

- 17) Joannou, M. V.; **Bezdek, M. J.**; Chirik, P. J. "Pyridine(diimine) Molybdenum-Catalyzed Hydrogenation of Arenes and Hindered Olefins: Insights into Precatalyst Activation and Deactivation Pathways." *ACS Catal.* **2018**, 8, 5276–5285.
- 16) Schmidt, V. A.; Kennedy, C. R.; **Bezdek, M. J.**; Chirik, P. J. "Selective [1,4]-Hydrovinylation of 1,3-Dienes with Unactivated Olefins Enabled by Iron Diimine Catalysts." *J. Am. Chem. Soc.* **2018**, 140, 3443–3453.
- 15) **Bezdek, M. J.**; Chirik, P. J. "Interconversion of Molybdenum Imido and Amido Complexes by Proton–Coupled Electron Transfer." *Angew. Chem. Int. Ed.* **2018**, 57, 2224–2228.
- 14) Joannou, M. V.; **Bezdek, M. J.**; Al-Bahily, K.; Korobkov, I.; Chirik, P. J. "Synthesis and Reactivity of Pyridine(diimine) Molybdenum Olefin Complexes: Ethylene Dimerization and Alkene Dehydrogenation." *Organometallics* **2017**, 36, 4215–4223.
- 13) Margulieux, G. W.; **Bezdek, M. J.**; Turner, Z. R.; Chirik, P. J. "Ammonia Activation, H₂ Evolution and Nitride Formation from a Molybdenum Complex with a Chemically and Redox Noninnocent Ligand." *J. Am. Chem. Soc.* **2017**, 139, 6110–6113.
- 12) **Bezdek, M. J.**; Pappas, I.; Chirik, P. J. "Determining and Understanding N–H Bond Strengths in Synthetic Nitrogen Fixation Cycles." *Top. Organomet. Chem.* **2017**, 60, 1–21.
- 11) Krautwald, S.; **Bezdek, M. J.**; Chirik, P. J. "Cobalt-Catalyzed 1,1-Diboration of Terminal Alkynes: Scope, Mechanism, and Synthetic Applications." *J. Am. Chem. Soc.* **2017**, 139, 3868–3875.
- 10) Obligacion, J. V.; **Bezdek, M. J.**; Chirik, P. J. "C(sp²)–H Borylation of Fluorinated Arenes Using an Air-Stable Cobalt Precatalyst: Electronically Enhanced Site Selectivity Enables Synthetic Opportunities." *J. Am. Chem. Soc.* **2017**, 139, 2825–2832.
- 9) Léonard, N. G.; **Bezdek, M. J.**; Chirik, P. J. "Cobalt-Catalyzed C(sp²)–H Borylation with an Air-Stable, Readily Prepared Terpyridine Cobalt(II) Bis(acetate) Precatalyst." *Organometallics* **2017**, 36, 142–150.
- 8) Neely, J. M.; **Bezdek, M. J.**; Chirik, P. J. "Insight into Transmetalation Enables Cobalt-Catalyzed Suzuki–Miyaura Cross Coupling." *ACS Cent. Sci.* **2016**, 2, 935–942.
- 7) **Bezdek, M. J.**; Guo, S.; Chirik, P. J. "Coordination-induced weakening of ammonia, water, and hydrazine X–H bonds in a molybdenum complex." *Science* **2016**, 354, 730–733.
- 6) **Bezdek, M. J.**; Chirik, P. J. "Thermodynamics of N–H bond formation in bis(phosphine) molybdenum(II) diazenides and the influence of the trans ligand." *Dalton Trans.* **2016**, 45, 15922–15930.
- 5) **Bezdek, M. J.**; Chirik, P. J. "Expanding Boundaries: N₂ Cleavage and Functionalization beyond Early Transition Metals." *Angew. Chem. Int. Ed.* **2016**, 55, 7892–7896.
- 4) **Bezdek, M. J.**; Guo, S.; Chirik, P. J. "Terpyridine Molybdenum Dinitrogen Chemistry: Synthesis of Dinitrogen Complexes That Vary by Five Oxidation States." *Inorg. Chem.* **2016**, 55, 3117–3127.
- 3) Pogozhev, D. V.; **Bezdek, M. J.**; Schauer, P. A. Berlinguette, C. P. "Ruthenium(II) Complexes Bearing a Naphthalimide Fragment: A Modular Dye Platform for the Dye-Sensitized Solar Cell." *Inorg. Chem.* **2013**, 52, 3001–3006.
- 2) Bengi, L.; Kovács, B.; **Bezdek, M. J.**; Keszei, E. "Model-Free Deconvolution of Transient Signals Using Genetic Algorithms." *Handbook of Genetic Algorithms: New Research*; Adalberto Muñoz, Ignacio Rodriguez, Eds.; Nova Publishers: New York, **2012**, 41–59.
- 1) **Bezdek, M. J.** "On a generalization of the Blaschke-Lebesgue theorem for disk-polygons." *Contributions to Discrete Mathematics.* **2011**, 6, 83–91

PATENTS

- 1) **Bezdek, M. J.**; Liu, R. Y.; Swager, T. M. "Sensor Enabled by Catalytic System." *International Application No. PCT/US2021/029878. Date filed: 29 April 2021.*

INVITED LECTURES

06/2024	28 th Annual ACS Green Chemistry and Engineering Conference (<i>Atlanta, USA</i>)
03/2024	American Chemical Society Spring 2024 National Meeting (<i>New Orleans, USA</i>)
10/2023	Materials for Energy Conversion Laboratory, Empa - Swiss Federal Laboratories for Materials Science and Technology (<i>Dübendorf, Switzerland</i>)
09/2023	ETH Industry Day 2023 (<i>Zürich, Switzerland</i>)
05/2023	18 th International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS 2023; <i>Jeju, Korea</i>)
03/2023	Department of Chemistry, University of Valladolid (<i>Valladolid, Spain</i>)
01/2023	Swiss Snow Symposium (<i>Saas-Almagell, Switzerland</i>)
06/2022	Laboratory for Multiscale Materials Experiments, Paul Scherrer Institute (<i>Villigen, Switzerland</i>)
03/2022	Micro and Nanosystems Research Group, Department of Mechanical and Process Engineering, ETH Zürich, (<i>Zürich, Switzerland</i>)

OUTREACH LECTURES AND ACTIVITIES

03/2024	Chemistry Laboratory Demonstrations at “Treffpunkt Science City” <i>ETH Zürich</i> <ul style="list-style-type: none">▪ Expected Participants: ~50 adults from public.
07/2023	Panel Discussion Moderator at International Chemistry Olympiad (IChO) Career Evening <i>ETH Zürich</i> <ul style="list-style-type: none">▪ >350 IChO participants, aged 16–18.
07/2023	Chemistry Demonstrations at International Chemistry Olympiad (IChO) Open Lab Day <i>ETH Zürich</i> <ul style="list-style-type: none">▪ >350 IChO participants expected, aged 16–18.
04/2023	Preparatory Lectures, Swiss Chemistry Olympiad Association (SwissChO) Exam Week (<i>Zürich, Switzerland</i>) <ul style="list-style-type: none">▪ Delivered lectures on general inorganic chemistry to high school students in preparation for the International Chemistry Olympiad qualification exams.
11/2022	Inaugural Public Lecture, ETH Zürich (<i>Zürich, Switzerland</i>)
08/2022	Chemistry Demonstrations at “Kids’ Experimental Day” <i>ETH Zürich/University of Zürich Childcare</i> <ul style="list-style-type: none">▪ Participants: ~20 children aged 5-12.