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❖ Employment

- Assistant Professor, University of Pittsburgh, 2018 – present
- Columbia Nano Initiative Postdoctoral Fellow, 2016 – 2018

❖ Education

- *CNI Postdoctoral Fellow*, Department of Chemistry, Columbia University, New York, NY, 01/2016 to 05/2018. Advisor: Prof. Colin Nuckolls
- *Ph.D. in Chemistry*, Department of Chemistry, Harvard University, Cambridge, MA, 08/2010 to 05/2015. Advisor: Prof. Theodore A. Betley
- *A.M. in Chemistry*, Department of Chemistry, Harvard University, Cambridge, MA, 08/2010 to 05/2012. Advisor: Prof. Theodore A. Betley
- *B.S. in Chemistry*, Department of Chemistry, ITESM Campus Monterrey, Monterrey, Mexico, 08/2005 to 05/2010. Advisor: Prof. Jesus Valencia

❖ Awards and Honors

2021 NSF CAREER Award.
2020 ACS PRF Doctoral New Investigator Award.
2019 SNI Level I (National System of Researchers in México).
2016 Columbia Nano Initiative Postdoctoral Research Scientist Fellowship.
2015 Poster Prize Award 5th European Conference on Molecular Magnetism.
2015 Fellowship from the 5th European Conference on Molecular Magnetism.
2015 Featured in "Las 30 promesas" (The 30 promises) emitted by Grupo Editorial Expansion.
2012 ACS, Division of Inorganic Chemistry Student Travel Award.
2011 – 2012 CONACYT/Fundación México en Harvard Research Award.
2010 CONACYT/Fundación Mexico en Harvard Fellowship and Research Award, Fieser Graduate Research Award.
2008 Research Assistant Scholarship, Caltech.
2007 Summer Undergraduate Research Fellowship (SURF), Caltech.
2005 – 2010 Xorge A. Domínguez Scholarship, ITESM.
2005 – 2010 Special Chemistry Scholarship L.C.Q., ITESM.
2004 Honorary Mention in XV Mexican Physics Olympiad.

❖ Grant Proposals *Funded*

6. University of Pittsburgh, Center for Research Computing, "Tubularenes: expanding the boundaries of carbon-based nanotubes". Single PI. Amount: $0, 900,000 SUs (computational service units). Period: 03/2021-02/2022.
5. National Science Foundation, "CAREER: Tubularenes: a novel class of conjugated molecular nanotubes". Single PI. Amount: $679,989.00. Period: 09/2021-08/2026.
4. American Chemical Society Petroleum Research Fund Doctoral New Investigator, "Recycling hydrocarbons at polynuclear reaction sites". Single PI. Amount: $110,000.00. Period: 09/2020-08/2022.
3. University of Pittsburgh, Pitt Momentum Funds, "Fuel recycling at copper catalysts". Single PI. Amount: $16,000.00. Period: 03/2020-06/2021.
2. University of Pittsburgh, Center for Research Computing, "Tubularenes: redefining carbon-based nanotubes". Single PI. Amount: $0, 1,300,000 SUs (computational units). Period: 03/2020-02/2021.

1. University of Pittsburgh, Central Research Development Fund, "Tubular[n]arenes: wire-like cylindrical organic conductors". Single PI. Amount: $18,000.00. Period: 07/2019-06/2021.

❖ Publications (Google scholar metrics: H-index=18; 1259 citations as of 8/29/2021)

*At Pitt (independent career, * = corresponding author)*

36. Mirzaei, S.; Espinoza Castro, V.; **Hernández Sánchez, R.*** "Quantum confinement at molecular carbon-based nanotubes". *In preparation*.
35. Osei, M.; Mirzaei, S.; **Hernández Sánchez, R.*** "Cuprophilic and argentophilic interactions between tetranuclear clusters". *In preparation*.
34. Mirzaei, S.; Espinoza Castro, V.; **Hernández Sánchez, R.*** "Nonspherical anion recognition by supramolecular cages ". *Submitted*.
33. Osei, M.; Mirzaei, S.; Rahman, M. A.; Castro, E.; **Hernández Sánchez, R.*** "Hole delocalization within square planar [Cu_4] clusters ". *Submitted*.
32. Mirzaei, S.; Castro, E.; **Hernández Sánchez, R.*** "Conjugated Molecular Nanotubes". *Chem. Eur. J.* **2021**, *27*, 8642.
31. Castro, E.;[§] Mirzaei, S.;[§] **Hernández Sánchez, R.*** "Radially Oriented [*n*]Cyclo-*meta*-phenylenes". *Org. Lett.* **2021**, *23*, 87. § = contributed equally.
30. Gadjieva, N. A.; Szimai, P.; Sági, O.; Alemany, P.; Conejeros, S.; Paley, D. W.; **Hernández Sánchez, R.**; Fowler, B.; Náfrádi, B.; Forró, L.; Roy, X. S.; Batail, P.;* Canadell, E.;* Steigerwald, M. L.;* Nuckolls, C.* "Intermolecular Resonance Correlates Electron Pairs Down a Supermolecular Chain: Antiferromagnetism in K-Doped p-Terphenyl". *J. Am. Chem. Soc.* **2020**, *142*, 20624.
29. Mirzaei, S.;[§] Castro, E.;[§] **Hernández Sánchez, R.*** "Tubularenes". *Chem. Sci*. **2020**, *11*, 8089. § = contributed equally.

Before Pitt

28. Liu, T.; Yang, J.; Geyer, F.; Conrad-Burton, F.; **Hernández Sánchez, R.**; Li, H.; Zhu, X.; Xiao, S.; Nuckolls, C.; Steigerwald, M. "Stringing the Perylene Diimide Bow". *Angew. Chem. Int. Ed.* **2020**, *59*, 14303.
27. Conrad-Burton, F.; Liu, T.; Geyer, F.; Costantini, R.; Schlaus, A.; Spencer, M.; Wang, J.; **Hernández Sánchez, R.**; Zhang, B.; Xu, Q.; Steigerwald, M.; Xiao, S.; Li, H.; Nuckolls, C.; Zhu, X. "Controlling Singlet Fission by Molecular Contortion". *J. Am. Chem. Soc.* **2019**, *141*, 13143.
26. Bartholomew, A. K.; Teesdale, J. J.; **Hernández Sánchez, R.**; Malbrecht, B.J; Juda, C.; Ménard, G.; Bu, W.; Iovan, D. A.; Mikhailine, A. A.; Zheng, S.-L.; Sarangi, R.; Wang, S. G.; Chen, Y.-S.; Betley, T. A. "Exposing the inadequacy of redox formalisms by resolving redox inequivalence within isovalent clusters". *Proc. Natl. Acad. Sci*. **2019**, *116*, 15836.
25. Milton, M.; Schuster, N.; Paley, D. W.; **Hernández Sánchez, R.;** Ng, F.; Steigerwald, M. L.; Nuckolls, C. "Defying Strain in the Synthesis of an Electroactive Bilayer Helicene". *Chem. Sci.* **2019**, *10*, 1029.
24. **Hernández Sánchez, R.;** Betley, T. A. "Thermally Persistent High-Spin Ground States in Octahedral Iron Clusters". *J. Am. Chem. Soc.* **2018**, *140*, 16792.
23. **Hernández Sánchez, R.***; Champsaur, A. M.; Choi, B.; Wang, S. G.; Bu, W.; Roy, X.; Chen. Y.-S.*; Steigerwald, M. L.*; Nuckolls, C.*; Paley, D. W.*. "Electron cartography in clusters". *Angew. Chem. Int. Ed.* **2018**, *57*, 13815.
22. Schuster, N.; **Hernández Sánchez, R.**; Bukharina, D.; Kotov, N. A.; Breova, N.; Ng, F.*; Steigerwald, M. L.*; Nuckolls, C.*. "A Helicene Nanoribbon with Greatly Amplified Chirality". *J. Am. Chem. Soc.* **2018**, *140*, 6235.
21. Zhang, B.;[§] **Hernández Sánchez, R.;**[§] Zhong, Y.; Ball, M.; Terban, M. W.; Paley, D.; Billinge, S. J. L.; Ng, F.; Steigerwald, M. L.; Nuckolls, C. "Hollow Organic Capsules Assemble into Cellular Semiconductors". *Nat. Commun.* **2018**, *9*, 1957. **§** = equal contribution.

20. Milton, M.; Cheng, Q.; Yang, Y.*; Nuckolls, C.*; **Hernández Sánchez, R.***; Sisto, T.* "Molecular materials for Non-Aqueous Flow Batteries with High Coulombic Efficiency and Stable Cycling". *Nano Lett.* **2017**, *17*, 7859.
19. Keener, M.; Peterson, M.; **Hernández Sánchez, R.**; Oswald, V. F.; Wu, G.; Ménard, G.*. "Towards Catalytic Ammonia Oxidation to Dinitrogen: A Synthetic Cycle Using a Simple Manganese Complex". *Chem. Eur. J.* **2017**, *23*, 11479.
18. Amiri, H.; Shepard, K.*; Nuckolls, C.*; **Hernández Sánchez, R.***. "Single-Walled Carbon Nanotubes: Mimics of Biological Ion Channels". *Nano Lett.* **2017**, *17*, 1204.
17. Lee, H.; Campbell, M. G.; **Hernández Sánchez, R.**; Börgel, J.; Raynaud, J.; Parker, S. E.; Ritter, T. "Mechanistic Insight Into High-Spin Iron(I)-Catalyzed Butadiene Dimerization". *Organometallics* **2016**, *35*, 2923.
16. Furneaux, A. G.; Piro, N. A.; **Hernández Sánchez, R.**; Garmigna, K. M.; Fey, N.; Robinson, M. J.; Kassel, W. S.; Nataro, C. "Specroscopic, structural and computational analysis of $[Re(CO)_3(dippM)Br]^{n+}$ (dippM = 1,1'-bis(diiso-propylphosphino)metallocene, M = Fe, n = 0 or 1; M = Co, n = 1)". *Dalton Trans.* **2016**, *45*, 4819.
15. Blass, B. L.; **Hernández Sánchez, R.**; Decker, V. A.; Robinson, M. J.; Piro, N. A.; Kassel, W. S.; Diaconescu, P. L.; Nataro, C. "Structural, Computational, and Spectroscopic Investigation of [Pd(κ^3-1,1'-bis(di-*tert*-butylphosphino)ferrocenediyl)X]$^+$ (X = Cl, Br, I) Compounds". *Organometallics* **2016**, *35*, 462.
14. **Hernández Sánchez, R.**; Bartholomew, A.; Powers, T.; Ménard, G.; Betley, T. A. "Maximizing electron exchange in a [Fe_3] cluster". *J. Am. Chem. Soc.* **2016**, *138*, 2235.
13. **Hernández Sánchez, R.;** Betley, T. A. "Meta-Atom Behavior in Clusters Revealing Large Spin Ground States". *J. Am. Chem. Soc.* **2015**, *137*, 13949.
12. **Hernández Sánchez, R.**; Zheng, S.-L.; Betley, T. A. "Ligand Field Strength Mediates Electron Delocalization in Octahedral $[(^{H}L)_2Fe_6(L')_m]^{n+}$ Clusters". *J. Am. Chem. Soc.* **2015**, *137*, 11126.
11. **Hernández Sánchez, R.**; Willis, A. M.; Zheng, S.-L.; Betley, T. A. "Synthesis of Well-Defined Bicapped Octahedral Iron Clusters $[(^{tren}L)_2Fe_8(PMe_2Ph)_2]^n$ (n = 0, –1)". *Angew. Chem. Int. Ed.* **2015**, *54*. 12009.
10. Cramer, S. A.; **Hernández Sánchez, R.**; Brakhage, D. F.; Jenkins, D. M. "Probing the role of an Fe^{IV} tetrazene in catalytic aziridination". *Chem. Commun.* **2014**, *50*, 13967.
9. Wu, B.; **Hernández Sánchez, R.**; Bezpalko, M. W.; Foxman, B. M.; Thomas, C. M. "Formation of a Heterobimetallic Zirconium/Cobalt Diimido Complexes via a Four-Electron Transformation". *Inorg. Chem*. **2014**, *53*, 10021.
8. Powers, T. M.; Gu, N. X.; Fout, A. R.; Baldwin, A. M.; **Hernández Sánchez, R.**; Alfonso, D. M.; Chen, Y.-S.; Zheng, S.-L; Betley, T. A. "Synthesis of Open-Shell, Bimetallic Mn/Fe Trinuclear Clusters". *J. Am. Chem. Soc.* **2013**, *135*, 14448.
7. Eames, E.; **Hernández Sánchez, R.**; Betley, T. A. "Metal atom lability in polynuclear complexes". *Inorg. Chem.* **2013**, *56*, 5006.
6. Kraft, S. J.; **Hernández Sánchez, R.**; Hock, A. S. "A Remarkably Active Iron Catecholate Immobilized in a Porous Organic Polymer". *ACS Catal.* **2013**, *3*, 826.
5. Wong, L. J.; **Hernández Sánchez, R.**; Glancy Logan, J.; Zarkesh, R. A.; Ziller, J. W.; Heyduk, A. F. "Disulfide reductive elimination from an iron(III) complex". *Chem. Sci.* **2013**, *4*, 1906.
4. Harris, T. D.; Zhao, Q.; **Hernández Sánchez, R.**; Betley, T. A. "Expanded Redox Accessibility via Ligand Substitution in an Octahedral Fe_6Br_6 Cluster". *Chem. Commun.* **2011**, *47*, 6344.
3. Yamazaki, Y.; **Hernandez-Sanchez, R.**; Haile, S. M. "Cation nonstoichiometry in yttrium-doped barium zirconate: phase behavior, microstructure, and proton conductivity". *J. Mater. Chem.* **2010**, *20*, 8158-8166.
2. Telila, H.; Mamo, T.; **Hernandez Sanchez, R.** "The Fabrication of nanoparticle CsH_2PO_4 Electrolyte for Fuel Cell Applications". *Caltech Undergraduate Research Journal* **2009**, Vol. *9* (No. 1), 33 – 39.
1. Yamazaki, Y.; **Hernandez-Sanchez, R.**; Haile, S. M. "High Total Proton Conductivity in Large-Grained Yttrium-Doped Barium Zirconate". *Chem. Mater.* **2009**, *21* (13), 2755-2762.

❖ Patents

At Pitt (independent career)

2. Mirazaei, S.; Castro, E.; Hernández Sánchez, R. "Synthesis of Nanotubular Molecules". U.S. Non-Provisional Patent **US 17/386,100** filed July 27th, 2021.

As postdoc

1. Milton, M.; Cheng, Q.; Yang, Y.*; Nuckolls, C.*; **Hernández Sánchez, R.***; Sisto, T.* "Non-Aqueous Flow Batteries". **US 16/792,501** and **WO 2019/036633 A1**.

❖ Books

At Pitt (independent career)

1. Castro, E.; Mirzaei, S.; **Hernández Sánchez, R.*** "Carbon-based nanotubes". De Gruyter, *in editorial production*.

❖ Synergistic Activities and Contributions to Diversity

4. Founder of Tips For Students (TFS), designed to guide undergraduates in their career decision making process by conveying the story of recent bachelor graduates working in academia and industry. **June 2021 – present**.
3. Faculty support and founder of the Alliance for Diversity in Science and Engineering (ADSE) Chapter at the University of Pittsburgh. **2019 – present**. Last activity in Feb 2021 gathered ~700 high school students in Pittsburgh.
2. Mentor at Eureka Street Corporation (www.eurekastreet.org). **2018 – present**. Student mentoring program to support students from minority serving institutions on their applications to graduate programs in Physics and Chemistry in the USA. Students mentored (2018-present) = 3.
1. City Coordinator of "Clubes de Ciencia México" (www.clubesdeciencia.mx). **2017 – present**. Science outreach program designed to bring hands-on week-long workshops in STEM to students in high school and undergraduate in Mexico. The instructors are PhD/postdocs volunteers from top universities in the United States and Mexico. Since my involvement, we have reached more than 500 students in Chihuahua City.

❖ Collaborators

Collaborators at University of Pittsburgh: Prof. Sunil Saxena, Prof. Peng Liu, Prof. James Mckone, and Prof. Nathaniel Rosi (Department of Chemistry).
Collaborators at University of Texas, El Paso: Prof. Luis Echegoyen (Department of Chemistry and Biochemistry).
Collaborators at Argonne National Laboratory: Dr. Yu-Sheng Chen (ChemMatCARS – The University of Chicago).
Collaborators at Georgia Institute of Technology: Prof. Juan Pablo Correa-Baena (School of Materials Science and Engineering).
Collaborators at Université Paris-Saclay: Orsay: Dr. Pawel Wzietek (Laboratoire de Physique des Solides).
Collaborators at University of Angers (CNRS): Prof. Patrick Batail.
Graduate Advisor: Professor Theodore A. Betley (Harvard).
Postdoctoral Sponsors: Professor Colin Nuckolls (Columbia) and Columbia Nano Initiative.

❖ Mentorship

Current: Ph.D. students: (5) Swati Arora, Victor Espinoza Castro, Brett Lucht, Saber Mirzaei, and Manasseh Osei.

Past: *postdoctoral supervision*: (2) Dr. Edison Arley Castro Portillo, Dr. Thomas Allen. *Undergraduate students*: (8) Nicolas D'Annunzio, Ryan W. McLane, Madison Keating, James Dages, Bridget Glessner, Addison Averill, Derek Lamb, and Emily Nicola.

❖ Teaching Accomplishments

- Chemistry 2120, Fall 2021 – Descriptive Inorganic and Organometallic Chemistry – 16 PhD students.
- Chemistry 1130/Chemistry 2180, Spring 2021 – Inorganic Chemistry (capstone course) – 2 graduate and 26 undergraduate students.
- Chemistry 2120, Fall 2020 – Descriptive Inorganic and Organometallic Chemistry – 17 PhD students.
- Chemistry 1130, Spring 2020 – Inorganic Chemistry (capstone course) – 33 undergraduate students.
- Chemistry 2120, Fall 2019 – Descriptive Inorganic and Organometallic Chemistry – 17 PhD students.
- Chemistry 2120, Fall 2018 – Descriptive Inorganic and Organometallic Chemistry – 18 PhD students.

❖ Invited Presentations

27. Breaking Barriers Through Chemistry, sponsored by Thieme and The University of Texas A&M (online), August **2021**.
26. The College of New Jersey, departmental seminar (online), March **2021**.
25. American Chemical Society, Division of Inorganic Chemistry "Periodic Table Talks", national conference (online), Feb **2021**.
24. Autonomous University of Juarez City, October **2020**, Juarez City (online), Mexico.
23. Tesla Institute, June **2020**, Juarez City (online), México.
22. Hampton University, October **2019**, Hampton, VA, USA.
21. University of Maryland, October **2019**, College Park, MD, USA.
20. Northwestern University, September **2019**, Evanston, IL, USA.
19. University of Colorado Boulder, February **2018**, Boulder, CO, USA.
18. Indiana University Bloomington, February **2018**, Bloomington, IN, USA.
17. University of California San Diego, January **2018**, San Diego, CA, USA.
16. University of California Riverside, January **2018**, Riverside, CA, USA.
15. University of Pittsburgh, January **2018**, Pittsburgh, PA, USA.
14. University of Illinois Urbana-Champaign, January **2018**, Champaign, IL, USA.
13. Princeton University, January **2018**, Princeton, NJ, USA.
12. University of Minnesota, December **2017**, Minneapolis, MN, USA.
11. Tufts University, December **2017**, Medford, MA, USA.
10. Duke University, December **2017**, Durham, NC, USA.
9. University of Massachusetts Amherst, December **2017**, Amherst, MA, USA.
8. Columbia Friday Synthesis Symposium, November **2017**, New York, USA.
7. Boston Regional Inorganic Colloquium (BRIC, Harvard), April **2017**, Cambridge, MA.
6. MRSEC Seminar, Columbia University, October **2016**, New York, USA.
5. Nanostructure in the City Symposium, October **2016**, New York, USA.
4. Columbia Friday Synthesis Symposium, May **2016**, New York, USA.
3. Undergraduate Chemistry Seminar (ITESM), October **2015**, Monterrey, México.
2. MIT Enterprise Forum Mexico, August **2015**, Oaxaca, México.
1. Movimiento NOMADX, August **2015**, Chihuahua, México.

❖ Contributed Presentations

17. American Chemical Society National Meeting, August **2019**, San Diego, CA.
16. MRSEC retreat seminar, Columbia University, May **2017**, New York, USA.
15. American Chemical Society National Meeting, April **2017**, San Francisco, CA.
14. Gordon Research Conference and Seminar: Inorg. Reaction Mech., March **2017**, Houston, TX.
13. 5th European Conference on Molecular Magnetism, September **2015**, Zaragoza, Spain.

12. American Chemical Society National Meeting, August **2015**, Boston, MA.
11. American Chemical Society National Meeting, August **2014**, San Francisco, CA.
10. Gordon Research Conference and Seminar: Inorganic Chemistry, June **2014**, Biddeford, MA.
9. American Chemical Society National Meeting, April **2013**, New Orleans, LA.
8. American Chemical Society National Meeting, March **2012**, San Diego, CA.
7. Boston Regional Inorganic Colloquium (BRIC), October **2011**, Worcester, MA.
6. Bachelor Thesis Proposal Seminar, November **2009**, Monterrey, México.
5. Undergraduate Chemistry Seminar: "Nanodics at interfaces: combined application of SPR and AFM", October **2009**, Monterrey, México.
4. Undergraduate Chemistry Seminar: "Yttrium-Doped Barium Zirconate. Defect Chemistry Study to Understand its Protonic Conductivity", November **2008**, Monterrey, México.
3. Undergraduate Chemistry Seminar: "Effect of Barium Deficiency on the Proton Conductivity of $Ba_{1-x}Zr_{0.8}Y_{0.2}O_{3-\delta}$", September **2007**, Monterrey, México.
2. Summer Undergraduate Research Fellowship Seminar: "Effect of Barium Deficiency on the Proton Conductivity of $Ba_{1-x}Zr_{0.8}Y_{0.2}O_{3-\delta}$", August **2007**, Pasadena, CA.
1. Undergraduate Chemistry Seminar: "Thermal Differential Analysis of a Vitreous Sample", November **2006**, Monterrey, México.