YAGYA N. REGMI

yregmi@gmail.com, (307) 343-0736
810 Coleman Ave, Apt 11, Menlo Park, CA, 94025

Synopsis: *Inorganic PhD chemist with postdoctoral experience in energy technologies and biomass conversion. Expertise includes electrochemical energy conversion device assembly and technology validation, materials synthesis and characterization, catalysis, electrochemical conversion of carbon dioxide to value added chemicals, and biomass conversion to generate value added platform chemicals. Google Scholar, LinkedIn*

EDUCATION/WORK: Scientific

Manchester Fuel Cell Innovation Centre
Research Fellow, Manchester Metropolitan University — 2019 -

Lawrence Berkeley National Laboratory, Berkeley, California, USA — 2018- 2019
Postdoctoral Researcher, Energy Technologies Area
Advisors: Dr. Nemanja Danilovic and Dr. Adam Weber

Center for Renewable Carbon, Knoxville, Tennessee, USA — 2016 - 2017
Postdoctoral Research Associate
Advisors: Prof. Nicole Labbé and Dr. Stephen C. Chmely

University of Wyoming, Laramie, Wyoming, USA — 2010 – 2015
Ph.D. Inorganic/Materials Chemistry
Advisor: Dr. Brian M. Leonard

University of Montana, Missoula, Montana, USA — 2006 – 2008
Graduate studies in Structural Biochemistry
Advisor: Dr. Klara Briknarova

Lyon College, Batesville, Arkansas, USA — 2001 – 2004
BS in Chemistry with Physics minor
Advisors: Dr. David Pace and Dr. Stuart Hutton

PUBLICATIONS: *[Published – 14, first author – 7, highly cited/hot paper – 3, invited article – 2, corresponding author – 2, h-index – 7, total google scholar citations – 751]*

14. Gauthier J. A., King L. A., Tucker-Stults F., Flores R. A., Kibsgaard J., Regmi Y. N., Chan K., Jaramillo T. F. *"Transition Metal Arsenide Catalysts for the Hydrogen Evolution Reaction."* **J. Phys. Chem. C (2019)**, Accepted Manuscript.

13. Charles E. W., Mukarakate C., Xu M., Regmi Y. N., Hamilton C., Schaidle J. A., Labbé N., Chmely S. C. *"Vapor-phase Stabilization of Biomass Pyrolysis Vapors Using Mixed-metal Oxide Catalysts."* **ACS Sustainable Chem. Eng. (2019)** 7 (7), 7386.

12. Regmi Y. N., Mann J. K., McBride J. R., Tao J., Barnes C. E., Labbé N., and Chmely S. C.*"Catalytic transfer hydrogenolysis of organosolv lignin using B-containing FeNi alloyed catalysts."* **Catal. Today** (**2018**), 302, 190 *(Invited)*

11. Regmi Y. N., Roy A., King L. A., Cullen D. A., Meyer H. M., Goenaga G. A., Zawodzinski T. A., Labbé N., and Chmely S. C. "*Lattice Matched Carbide-Phosphide Composites with Superior Electrocatalytic Activity and Stability*." **Chem. Mater.**, **(2017)**, 29 (21), 9369.

10. Haber H. L., Kim P., Chmely S. C., Lloyd J., Regmi Y. N., Abdoulmoumine N., Labbé N. "*An Environmentally Friendly Process for Recovery of Wood Preservative from Used Copper Naphthenate Treated Railroad Ties*." **ACS Sustainable Chem. Eng.** (**2017**), 5 (11), 10806.

9. Regmi Y. N., Rogers B. R., Labbé N., and Chmely S. C. "*Scalable and Tunable Carbide-Phosphide Composite Catalyst System for the Thermochemical Conversion of Biomass*." **ACS Sustainable Chem. Eng. (2017)**, 5 (9), 7751

8. Stacy J., Yost A. J., Regmi Y. N., Leonard B. M., Chien T. and Fan M. *"A Facile Synthesis of Highly Stable Modified Carbon Nanotubes as Efficient Oxygen Reduction Reaction Catalysts."* **ChemistrySelect** (**2017)**, 2, 1932.

7. Regmi Y. N., Roy A., Goenaga G. A., McBride J. R., Rogers B. R., Zawodzinski T. A.., Labbé N., and Chmely S. C. "*Electrocatalytic Activity and Stability Enhancement via Preferential Deposition of Phosphide on Carbide*." **ChemCatChem** (**2017**), 9, 1054.

6. Stacy J., Regmi Y. N., Leonard B. M. and Fan M. "*The Recent Progress and Future of Oxygen Reduction Reaction Catalysis: A review*." **Renew. Sust. Energ. Rev**. (**2017**), 69, 401. *(Invited)*

5. Regmi Y. N., Wan C., Duffee K. D. and Leonard B. M.. "*Nanocrystalline Mo_2C as a Bifunctional Water Splitting Electrocatalyst.*" **ChemCatChem** (**2015**), 7(23), 3911.

4. Regmi Y. N., Waetzig G. R., Duffee K. D., Schmuecker S. M., Thode J. M. and Leonard B. M. "*Carbides of Group IVA, VA and VIA Transition Metals as Alternative HER and ORR Catalysts and Support Materials*." **J. Mater. Chem. A** (**2015**), 3(18), 10085. *(Hot Paper 2015 collection).*

3**.** Regmi Y. N. and Leonard B. M. "*A General Synthesis Method for Bimetallic Carbides of Group VIIIA First Row Transition Metals with Molybdenum and Tungsten*" **Chem. Mater.** (**2014**), 26(8), 2609.

2**.** Wan C., Regmi Y. N., Leonard B. M. "*Multiple Phases of Molybdenum Carbide as Electrocatalysts for the Hydrogen Evolution Reaction.*" **Angew. Chem. Int. Ed.** (**2014**), 53, 6407. *(Designated 'Highly Cited Paper' by Web of Science).*

1. Pace D. R and Regmi, Y. N. "*The Finkelstein Reaction: Quantitative Reaction Kinetics of an SN2 Reaction Using Nonaqueous Conductivity*." **J. Chem. Educ.** (**2006**), 83, 1344.

Under Review/In Preparation

4. Regmi Y. N., Mann J. K., Rogers B. R., Barnes C. E., Laursen S., Labbé N., and Chmely S. C. "*Catalytic Deoxygenation Pathway for Lignin Model Molecules under Critical Ethanol Conditions and Transition Metal Boride Catalysts*."

2. Regmi Y. N. and Leonard B. M. "*Hydration and Structure Dependent OER Activities of Bimetallic Oxides of Group VIIIA Transition Metals."*

1. Regmi Y. N. and Leonard B. M. "*Bimetallic Carbides of Mo and W for electrocatalysis*."

Provisional Patents

1. "Conductive and stable catalyst supports and microporous layer materials for high voltage applications" – 2-19-050. Nemanja Danilovic and Yagya Regmi, 2019.
2. "Carbide-Phosphide Catalysts and Methods There of" – Serial Number 62/353389. Stephen Chmely, Nicole Labbé and Yagya Narayan Regmi, 2016.

CONFERENCES AND MEETINGS [*Talks (T) – 10, Posters (P) – 6, Session Presider (S) – 2]*

18. "Chemistry of Materials: Materials for Energy & Catalytic Applications" at ACS National Meeting, San Diego, CA, USA. Aug 25-29 (2019) (S)

17. "Corrosion-Resistant Precious Metal Coated Oxide Nanoparticles As Supports for Iridium-Based Oxygen Evolution Reaction Catalysts in Proton Exchange Membrane Electrolyzers" ACS National Meeting, San Diego, CA, USA. Aug 25-29 (2019) (T)

16. "Experimental Analysis of Operating Conditions of Proton Exchange Membrane Based Unitized Regenerative Fuel Cells for Efficient and Economic Energy Conversion" 235 ECS Meeting, Dallas, TX, USA. May 26-30 (**2019**) (T).

15. "Active and Stable Electrocatalyst Supports and Microporous Layers for Anode Applications in PEM Electrolyzers" United States Department of Energy, Hydrogen and Fuel Cells Program 2019 Annual Merit Review Meetings, Crystal City, VA, USA. April 29 – May 1. (**2019**) (P)

14. "Unitized Reversible Fuel Cell: Materials and device development for efficient and economic energy conversion and storage" Next Generation Electrochemistry 2018, University of Illinois, Chicago, IL, USA. June 3-9 **(2018)** (P)

13. "Carbide-Phosphide Heterostructures for Electrochemical Water Splitting" 2017 Joint Nanoscience and Neutron Scattering User Meeting, Oak Ridge National Laboratory, Oak Ridge, TN, USA. July 31 – Aug 4, **(2017)** (P).
12. "Comparative electrocatalytic activities of bimetallic oxides and carbides of iron, nickel and cobalt with tungsten and molybdenum as the second transition metal" 253rd ACS National Meeting, San Francisco, CA, USA. April 2-6 (**2017**) (T)
11. "Exploring Transition Metal Carbides and Phosphides for Ex-Situ Catalytic Fast Pyrolysis" 2016 AIChE Annual Meeting in San Francisco, CA, USA. Nov 13-18 (**2016**), 466889 (T)
10. "Hydration Dependent Electrocatalytic Activities of Bimetallic Oxides of Ni, Co and Fe" 252nd ACS National Meeting in Philadelphia, PA, USA. Aug 21-25 (**2016**), INOR 561 (T)
9. "Chemistry of Materials: Materials for Energy & Catalytic Applications" invited session presider at 252nd ACS National Meeting in Philadelphia, PA, USA. Aug 21-25 (**2016**) (S)
8. "Nickel Phosphide and Molybdenum Carbide Composite Materials for Biomass Upgrading" 252nd ACS National Meeting in Philadelphia, PA, USA. Aug 21-25 (**2016**), CATL 146 (T)
7. "Biomass Upgrading Using Water Splitting Electrocatalysts" 252nd ACS National Meeting in Philadelphia, PA, USA. Aug 21-25 (**2016**), AEI 36 (P)
6. "Exploring Transition Metal Carbides and Phosphides for Ex-Situ Catalytic Fast Pyrolysis" 2016 AIChE Annual Meeting of Knoxville-Oak Ridge Section, Knoxville, TN, USA. Mar 17 (**2016**) (P)
5 "A comparative study of Fe_2N type Mo_2C electrocatalysts synthesized via four different methods**"** 249th ACS National Meeting, Denver, Colorado, March 22-26 (**2015**). CATL 75 (T)
4. "Bimetallic Carbides of Fe, Co and Ni with Mo and W as Catalysts and Support Materials" 2014 MRS Fall Meeting & Exhibit, Boston, MA, USA, Nov 30 – Dec 5 (**2014**), S 1.08 (T)
3. "General Synthesis Method for Bimetallic Carbides of Group VIIIA First Row Transition Metals with Molybdenum and Tungsten for Fuel Cell Catalysis" 248th ACS National Meeting, San Francisco, CA, USA, Aug 10-14 (**2014**), INOR 1012 (T)
2. "Carbides of Group IVA, VA and VIA as Alternative HER and ORR Catalysts and Support Materials" 69th Northwest Regional ACS Meeting, Missoula, MT, USA, June 22- 24 (**2014**), NORM 150. (T)
1. "Preparation and Catalytic Activity of Phase Pure Bimetallic Carbides of Mo and W" 23rd Rocky Mountain Regional ACS Meeting, Westminster, CO, USA, Oct 17-20 (**2012**), RMRM 51 (P)

AWARDS, FUNDING AND SCHOLARSHIPS

- Lead author in US Department of Energy funded early stage grant ($50,000) titled 'Active and Stable Electrocatalyst Supports and Microporous Layers for Anode Applications in PEM Electrolyzers' currently active at Lawrence Berkeley National Laboratory. (2018)
- Contributing author in US Department of Energy funded grant titled 'Novel Bifunctional Electrocatalysts, Supports and Membranes for High Performing and Durable Unitized Regenerative Fuel Cells' currently active at Lawrence Berkeley National Laboratory. (2018)
- Leader author for the grant titled 'Developing novel catalysts to improve selectivity of electrochemical reduction of carbon dioxide' and awarded 96 hours ($60,000) of instrument time at The Molecular Foundry within Lawrence Berkeley National Laboratory for 2018-19. (2018)
- 'Elucidating structure-function relationships in alloyed nanomaterials that mediate catalytic transformations of biomass to fuels and chemicals' 160 hours ($96,000) instrument time at Oak Ridge National Lab under Center for Nanophase Materials Sciences (ORNL-CNMS) division user facility. CNMS2017-082 (2017)
- "Selective deposition of hexagonal nickel phosphide on hexagonal molybdenum carbide using hydrothermal method" 40 hours ($32,000) of STEM/EELS time at ORNL-CNMS division user facility. CNMS2016-R71 (2016)

- South-eastern Sun Grant Center Quarterly Progress Report for the project titled 'Production of platform chemicals from bio refinery technical lignin using supported base-metal nanocatalysts' for 2016. Completed
- Nominated for The University of Wyoming Outstanding Dissertation Award. (2016)
- American Chemical Society, Wyoming Chapter, Graduate Student Travel Award to attend 249th ACS National Meeting, Denver, CO, United States. (2015)
- American Chemical Society, Division of Inorganic Chemistry (ACS-DIC) Graduate Student Travel Award to attend 248th ACS National Meeting, San Francisco, CA, United states. (2014)
- University of Wyoming, Graduate Student Travel Award to attend MRS Fall Meeting & Exhibit, Boston, MA, United Sates. Additional funding awarded by department of chemistry. (2014)
- School of Energy Resources Graduate Student Fellowship for two years, University of Wyoming. (2012-2014)
- Lyon College Trustee Scholarship Lyon College, Batesville, AR, USA (2001-2005)
- Government of Nepal Nationwide Scholarship to study at Budhanilkantha School, Kathmandu, Nepal. (1991-2000)
- Invited and served as a manuscripts reviewer: ChemSusChem, Journal of Power Sources, ACS Applied Energy Materials, ACS Sustainable Chemistry and Engineering, Electrochimica Acta, International Journal of Hydrogen Energy, ChemElectroChem and MRS Proceedings. (Total – 45, 2 manuscripts/month on average)

RESEARCH SKILLS

- **Electrochemical Techniques –** Expert: Various amperometry and potentiometry techniques including cyclic voltammetry, linear sweep voltammetry and constant potential/current electrolysis. Other skills: Impedance spectroscopy
- **Microscopy and Materials Characterization –** Expert: Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (STEM), and Energy-Dispersive X-ray analysis (EDX), powder and single crystal X-Ray Diffraction (XRD), Brunauer−Emmett−Teller (BET) measurements, Thermogravimetric Analysis (TGA) and Differential Scanning Calorimetry (DSC). Other skills: Atomic Force Microscopy (AFM), Scanning and Aberration Corrected TEM, Electron Energy Loss Spectroscopy (EELS).
- **Synthesis –** Expert: Nanomaterials via hydrothermal, sol/gel, carbothermic reduction and temperature programmed reduction (TPR) methods in various furnaces and set ups including TGA-DSC and tube furnaces, Schlenk Lines, high pressure reactors, sand baths, and glove boxes. Other skills: Peptide expression and purification.
- **Spectroscopy –** Expert: Raman, UV-Vis, FT-IR, and Nuclear Magnetic Resonance (NMR), X-ray Photoelectron Spectroscopy (XPS).
- **Chemical Analysis –** Inductively Coupled Plasma – Optical Emission Spectroscopy (ICP-OES), size exclusion chromatography (SEC), Gas Chromatography (GC) and Mass Spectrometry (MS).

RESEARCH AND WORK EXPERIENCE

Lawrence Berkeley National Laboratory, Berkeley, CA, USA 2018 – Present
Post-Doctoral Researcher Advisors: Dr. Nemanja Danilovic and Dr. Adam Weber

Electrochemical device fabrication and development for energy conversion

- Explore technologies for generation of renewable fuels including proton exchange membrane based unitized reversible fuel cells, fuel cells, electrolyzers and bipolar membrane based devices for carbon dioxide reduction.
- Investigate efficient utilization of chemicals in electrochemical devices.
- Prepare and characterize advanced materials for conversion of oxides to hydrocarbons for transportation using existing infrastructure.

- Design and test catalysts for electrochemical conversion of carbon dioxide to value added chemicals and products.

Center for Renewable Carbon, University of Tennessee, TN, USA 2016 - 2017
Post-Doctoral Research Associate Advisors: Dr. Nicole Labbé and Dr. Stephen Chmely

Catalyst development for vapour phase biomass upgrading via heterogeneous catalysis using known water splitting nanomaterial catalysts

- Synthesis of nanostructured transition metal carbides, phosphides, borides, oxides and composites of the families of compounds.
- Ex-situ catalytic fast pyrolysis of cellulose, lignin and biomass using the nanostructured catalysts via tandem pyrolysis gas chromatography and mass spectrometry.
- Critical ethanol transfer hydrogenolysis using the transition metal catalysts and composites for depolymerization of lignin and develop green methods.
- Hydrodeoxygenation catalyzed by transition metal nanomaterials to study condensed phase transformations under high pressure hydrogen environments using batch reactors.
- Composites of carbide and phosphides synthesized via hydrothermal and sol-gel method are also being tested for hydrogen and oxygen evolution reactions in collaboration with researchers at Oak Ridge National Laboratories, Departments of Chemical and Biological Engineering at the University of Tennessee, Knoxville and Vanderbilt University.

University of Wyoming, Laramie, WY, USA 2010 – 2015
Graduate Research Assistant Advisor: Dr. Brian Leonard

Electrocatalysis using transition metal carbide and oxide nanocrystals

- Synthesis of nanopowder transition metal carbides and oxides and application to electrolyzer and fuel cell reactions.
- Synthesis of monometallic and bimetallic carbides of transition metals via methods such as salt flux, sol/gel and carbothermic reductions at relatively low temperatures (<1000 °C).
- Characterization of nanostructured materials using various diffraction, electron microscope and spectroscopic methods.

University of Montana, Missoula, MT, USA 2006 – 2008
Graduate Research Assistant Advisor: Dr. Klara Briknarova

Structural characterization of the protein sub-unit, anastellin, to investigate interactions and conformational changes in fibronectin fibril formation

- Expression, purification and characterization of anastellin using NMR, XRD and MALDI-MS

LifePlus International, Batesville, AR, USA. 2005 – 2006
Quality Control Analyst

- Responsible for testing the raw materials and products at the production facility for compliance to FDA standards using FTIR, HPLC, GC-MS and ion-selective amperometry.

Lyon College, Batesville, AR, USA 2001 - 2005
Undergraduate Summer Research Fellow (Summer 2003) Advisor: Dr. Stuart Hutton

Dielectric Relaxation in Mixed Solid Solutions of CuFeTAC:

- Fabrication of gold electrodes in an argon filled glove box for dielectric relaxation studies.

Undergraduate Summer Research Fellow (Summer 2004) Advisor: Dr. David Pace

Quantitative Reaction Kinetics of an S_N2 Reaction Using Nonaqueous Conductivity:

- The Finkelstein reaction was followed for the S_N2 characteristics using a UV-Vis instrument equipped with temperature regulated bath.

TEACHING AND MENTORING EXPERIENCE

Lawrence Berkeley National Laboratory, CA, USA
- Mentoring 2 undergraduate student. (2018 – present)

University of Tennessee, TN, USA
- Mentored 3 visiting scholars, 1 undergraduate and 3 graduate students resulting in their co-authorship in journal article publication. (2016 - 2017)

University of Wyoming, USA
- Substitute instructor for Advanced General Chemistry Course for 8 lectures (2015).
- First graduate student for PhD advisor and in that role trained subsequent 4 fellow graduate students regarding lab safety and graduate student research responsibilities besides providing equipment training (2010-2015).
- Mentored undergraduate students (3), resulting in their co-authorship in peer reviewed journal article publications.
- Graduate Teaching Assistant for Advanced General Chemistry, General Chemistry, and Quantitative Analysis. Responsible for writing exams, grading and running tutorials/workshops

Malpi International College, Kathmandu, Nepal
- Chemistry Teacher for Cambridge International O and A Level Chemistry Courses (2008 – 2010)

University of Montana, USA
- Graduate Teaching Assistant for General Chemistry (CHEM 161) Fall 2006 and (CHEM 162) Spring 2007, Organic Chemistry (CHEM 222) Fall 2007, and (CHEM 224) Spring 2008.

Lyon College, Arkansas, USA (2001 – 2004)
- Annual invited speaker for World Philosophies 101 and Anthropology 101.
- Apple Project math and science tutor for underprivileged and struggling high school students.

COMMUNITY SERVICE/VOLUNTEERING

- Big Basin Trail Crew.
  Clear the trails in The Big Basin State Park of fallen trees, construct washed out trails and clear every second Saturday of the month.
- The Tech Museum of Innovation, San Jose, CA, USA
  Volunteer Exhibition Interpreter 2017– 2018
- Bay Area Science Festival, San Francisco, CA, USA 2017
- Lyon College, Batesville, AR, USA
  Maths and Science Tutor Reorder volunteer experience Apple Project Upward Bound: Provide academic help in maths and sciences and motivate students from difficult social and economic backgrounds to attend colleges and universities. 2001–20015

PROFESSIONAL MEMBERSHIP

- American Chemical Society (ACS)
- Materials Research Society (MRS)
- American Institute of Chemical Engineers (AIChE)
- The Electrochemical Society (ECS)