

Nicolas GAILLARD, Ph.D.

I. PRESENT POSITION

Assistant Researcher (on tenure-track as of August 2017)

University of Hawaii (UH) at Manoa
Hawaii Natural Energy Institute (HNEI)
Thin Films Laboratory
ngaillar@hawaii.edu
Tel.: 808-956-2342

II. EDUCATION

- Ph.D. in Micro and Nanoelectronics / Physics Dpt. / Joseph Fourier University, France (2006).
- MS in Micro and Nanoelectronics / Physics Dpt. / Joseph Fourier University, France (2002).
- Engineering Degree in Optoelectronics / National Grad. School of Physics, France (2002).
- BS in Materials Science / Grenoble Institute of Technology, France (2000).

III. PROFESSIONAL EXPERIENCE

- 2009-present: **Assistant Researcher at UH/HNEI & Lead of the [Thin Films Laboratory](#)**
A center dedicated to the research and development of thin-film materials, interfaces, and devices for photovoltaic and photoelectrochemical applications.
- 2017-2019: **Director of the [UH Materials Science Consortium for Research and Education \(MS-CoRE\)](#)**
A cross-campus initiative which associates all UH's materials experts in one core group to promote Materials Sciences and develop basic collaboration-enabling resources.
- 2018-present: **[Cooperating graduate faculty](#) / UH Electrical Engineering.**
Level 3: advise and chair MS and PhD theses.
- 2017-present: **[Cooperating graduate faculty](#) / UH Mechanical Engineering.**
Level 3: advise and chair MS and PhD theses.
- 2017-present: **[Cooperating graduate faculty](#) / UH Chemistry.**
Level 1: serve a member of MS and PhD thesis committees.
- 2007-2009: **Postdoctoral Fellow / UH / HNEI**
Supervisor: Dr. Eric L. Miller.
Studied metal oxide and chalcopyrite thin film materials for photovoltaic and photoelectrochemical hydrogen production.

- 2003-2006: **R&D engineer / ST Microelectronics, Inc. / Grenoble, France**
 Supervisor: Dr. Mickael Gros-Jean.
Developed metal and dielectric thin film materials for commercial DRAM capacitor and CMOS transistor technologies.
- 2003-2006: **PhD candidate / Physics dept. / Joseph Fourier University**
 Supervisor: Pr. Ahmad Bsiesy.
 Thesis: *Impact of the Morphological, Electrical and Chemical Properties of Metal/Insulator Interfaces and their Impact on TiN/Ta₂O₅/TiN Capacitors.*
- 2002-2003: **Master's internship / Nippon Telegraph and Telecom (NTT) Basic Research Laboratories, Atsugi, Japan**
 Supervisor: Dr. Akira Fujiwara.
 Thesis: *Quantum Effects in Single Electron Transistors.*
- Summer 2002: **Internship / Alternative Energies and Atomic Energy Commission (CEA), Grenoble, France**
 Supervisor: Dr. Guillaume Ravel.
Characterized optical components for the Megajoule Laser research program.
- 1998-2000: **Apprenticeship / Alternative Energies and Atomic Energy Commission (CEA), Grenoble, France**
 Supervisor: Dr. Bernard Aspar.
Developed innovative substrates for the microelectronic industry.

IV. PROFESSIONAL SERVICES

a. Teaching

- (6) ME435/CHEM435-Experimental Methods in Materials Research: Fall'21, lead instructor, 6 students.
- (5) ME700-Thesis Research: Spring'21, lead instructor, 2 students.
- (4) ME700-Thesis Research: Fall'20, lead instructor, 2 students.
- (3) ME435-Experimental Methods in Materials Research: Fall'19, lead instructor, 8 students.
- (2) ME491-Materials for Renewable Energy: Fall'19, lead instructor, 5 students.
- (1) ME492- Materials for Renewable Energy: Fall'18, lead instructor, 15 students.

b. Supervision of employees, postdoctoral fellows and students (* next to last names indicate individuals supported by my grants and contracts)

- (30) Samuel Tessema* (EE Masters student, 08/2021-present, Chairperson: Gaillard).
- (29) Dr. Wilman Septina* (Postdoctoral Fellow, 06/2018-05/2021; RCUH Junior Researcher 06/2021-present).

- (28) Joshua Crunk* (ME Masters student, 08/2019-05/2021, Chairperson: Gaillard; Laboratory Assistant, RCUH temporary hire 06/2021-10/2021).
- (27) Kai Outlaw-Spruell* (ME Masters student, 08/20-05/21, Chairperson: Gaillard; Laboratory Assistant, RCUH temporary hire 06/2021-10/2021).
- (26) Thomas West* (ME undergraduate student, 01/2020-12/2020).
- (25) Alexander DeAngelis* (EE Masters student, 01/2011-12/2010, Chairperson: Miller; Laboratory Assistant, RCUH temporary hire, 12/2014-06/2015; UH Junior Researcher, 07/2015-06/2020).
- (24) Benjamin Thrun* (ME undergraduate student, 06/2019-12/2019).
- (23) Anne Giovanelli* (Intern, Auburn University, summer 2018).
- (22) Dr. Cecilia dos Santos Claro (Fulbright Visiting Scholar, 01/2018-04/2018).
- (21) Dr. Kimberly Horsley* (Postdoctoral Fellow, 10/2015-12/2017).
- (20) Julien Leoni* (Intern, Ecole Supérieure d'Ingénieurs de Rennes, France, summer 2016).
- (19) Stephen Bauer* (EE undergraduate student, 03/2016-06/2016).
- (18) Marcos Marchesi (Intern, University of Connecticut, summer 2015).
- (17) Aleca Borsuk* (ME undergraduate student, 12/2013-09/2015).
- (16) Dr. Marina Chong* (Postdoctoral Fellow, 06/2013-07/2015).
- (15) Dr. Aiping Zeng* (Postdoctoral Fellow, 05/2014-06/2015).
- (14) Andrew Madey* (Intern, University of Oregon, summer 2014).
- (13) Jon-Ross Okuda* (EE undergraduate student, 08/2012-06/2014).
- (12) Dr. Dixit Prasher* (Postdoctoral Fellow, 07/2012-11/2013).
- (11) Sonia Barney (Intern, University of Los Andes, Colombia, summer 2013).
- (10) Dr. Yuangcheng Chang (Postdoctoral Fellow, 06/2009-12/2012).
- (9) Jennifer Wong (Kapolei high school student, Fall 2012).
- (8) Tomoyuki Miura (ME undergraduate student, 11/2011-06/2012).
- (7) Dr. Jess Kaneshiro (EE Ph.D. student, 08/2009-05/2012, Chairperson: Miller).
- (6) Xi Song (EE Masters student, 01/2011-12/2011, Chairperson: Miller).
- (5) Stewart Mallory (Chemistry undergraduate student, 01/2010-12/2011),
- (4) Dr. Jeremy Kowalczyk (Physics Ph.D. student, 01/2009-01/2011, Chairperson: Mayde).
- (3) Dante Inouye (Kapolei high school student, Fall 2011).
- (2) Dr. Artur Braun (Visiting Scholar, EMPA, Swiss, summer 2010).
- (1) Dr. Dan Esposito (Visiting Scholar, University of Delaware, spring 2010).

c. Thesis and dissertation committees

- (5) K. Outlaw-Spruell, *Novel semi-monolithic tandem device architecture for photovoltaic devices*, M.S. Thesis, University of Hawaii, Mechanical Engineering, **Chair**, Spring 2021.
- (4) J. Crunk, *A transparent polymer with electrically conductive particles for solar devices*, M.S. Thesis, University of Hawaii, Mechanical Engineering, **Chair**, Spring 2021.
- (3) D. Palm, *Ultrathin Coating for Enhanced Durability in (Photo)electrochemical Hydrogen Production*, PhD Thesis, Stanford University, Chemical Engineering, Committee Member, Fall 2020.
- (2) M. S. Angelo, PhD candidate at UH Manoa, Mechanical Engineering, Comprehensive Examination, Committee Member, Fall 2018.
- (1) J. Kowalczyk, *Increased Power, Pulse Length, and Spectral Purity Free-electron Laser for Inverse-Compton X-ray Production and Laser Induced Breakdown Spectroscopy of Thin Film Photovoltaics*, PhD Thesis, UH Manoa, Physics, Committee Member, Fall 2011.

d. Organization of conference symposia and professional workshops

- (10) Co-organizer of [Recent Trends and Advances in Artificial Photosynthesis](#), The International Chemical Congress of Pacific Basin Societies 2021, Honolulu (HI), 2021.
- (9) Helped the Hawaii Tourism Authority secure the 2022 Materials Research Society (MRS) Spring Meeting by [promoting the UH Materials community to the MRS board of directors](#) (2018). This event is scheduled to bring over 4,000 scientists from all over the world, with an estimated economic impact of \$19 million to the state of Hawaii.
- (8) Co-organizer of [Symposium I05: Renewable Fuels via Artificial Photosynthesis 3](#), 233rd Electrochemical Society Meeting, Seattle (WA), 2018.
- (7) Co-organizer of [Symposium I03: Renewable Fuels via Artificial Photosynthesis 2](#), 231st Electrochemical Society Meeting, New Orleans (LA), 2017.
- (6) Co-organizer of [Symposium EE2: Advancements in Solar Fuels Generation](#), Materials Research Society Spring Meeting, Phoenix (AZ), 2016.
- (5) Lead Organizer of the 2012 U.S. DOE workshop on PEC H₂ production (Honolulu).
- (4) Co-organizer of the 2012 U.S. DOE workshop on PEC H₂ production (San Francisco).
- (3) Co-organizer of the 2011 U.S. DOE workshop on PEC H₂ production (San Francisco).
- (2) Lead Organizer of the 2010 U.S. DOE workshop on PEC H₂ production (Honolulu).
- (1) Lead Organizer of the 2008 U.S. DOE workshop on PEC H₂ production (Honolulu).

e. Chairing of conference sessions and professional workshops

- (19) 239th Electrochemical Society Meeting, Symposium I03, [Metal Oxides for Fuel Generation](#), N. Gaillard, Spring Digital Meeting, 2021.
- (18) 238th Electrochemical Society Meeting, Symposium L04, [Online Live Session 1](#), Nick Wu and N. Gaillard, Fall Digital Meeting, 2020.

- (17) 2nd Annual Advanced Water Splitting Technology Pathways, Benchmarking and Protocols Workshop, [*PEC Light Absorbers and Protective Layer Requirements & Tests*](#), N. Gaillard, Scottsdale (AZ), 2019.
- (16) Materials Research Society Spring Meeting, Symposium ES11, [*ES11.05: High Efficiency PEC Materials and Devices I*](#), N. Gaillard and S. Yu, Phoenix (AZ), 2019.
- (15) 233rd Electrochemical Society Meeting, Symposium I05, [*Narrow Band Gap Materials and Devices I*](#), N. Gaillard and E. L. Miller, Seattle (WA), 2018.
- (14) 233rd Electrochemical Society Meeting, Symposium I05, [*Solar Water Splitting II*](#), E. L. Miller and N. Gaillard, Seattle (WA), 2018.
- (13) 231st Electrochemical Society Meeting, Symposium I03, [*Metal Oxide-Based Photocatalysts and Photoelectrochemical Cells*](#), N. Gaillard, New Orleans (LA), 2017.
- (12) Materials Research Society Spring Meeting, Symposium EE2, [*Metal Oxides and Nitrides I*](#), F. Abdi, N. Gaillard, B. Parkinson and L. Vayssieres, Phoenix (AZ), 2016.
- (11) Materials Research Society Spring Meeting, Symposium EE2, [*Emerging Materials, Devices and Technologies*](#), S. Ardo, N. Gaillard, S. Haussener and J. Turner, Phoenix (AZ), 2016.
- (10) Materials Research Society Spring Meeting, Symposium EE2, [*Catalysis I*](#), A. Deangelis and N. Gaillard, Phoenix (AZ), 2016.
- (9) Materials Research Society Spring Meeting, Symposium EE2, [*III-V Materials*](#), N. Gaillard and H. Jia, Phoenix (AZ), 2016.
- (8) Materials Research Society Spring Meeting, Symposium EE2, [*Light Management*](#), N. Gaillard, Phoenix (AZ), 2016.
- (7) 230th Electrochemical Society Meeting, Symposium L04, [*Solar Hydrogen Generation IV*](#), N. Gaillard, Honolulu (HI), 2016.
- (6) 228th Electrochemical Society Meeting, Symposium L06, [*Solar Fuel Generation by Materials Beyond Oxides I*](#), R. T. Koodali and N. Gaillard, Phoenix (AZ), 2015.
- (5) 228th Electrochemical Society Meeting, Symposium L06, [*Integrated Approached For Solar Fuel Generation*](#), G. S. Jackson and N. Gaillard, Phoenix (AZ), 2015.
- (4) 228th Electrochemical Society Meeting, Symposium L06, [*Metal Oxide Photocatalysts*](#), N. Gaillard and Eric L. Miller, Phoenix (AZ), 2015.
- (3) 226th Electrochemical Society Meeting, Symposium L04, [*Invited Presentations on Water Splitting I*](#), N. Gaillard and R. T. Koodali, Cancun (Mexico), 2014.
- (2) 226th Electrochemical Society Meeting, Symposium L04, [*Invited Presentations on Water Splitting II*](#), R. T. Koodali and N. Gaillard, Cancun (Mexico), 2014.
- (1) 224th Electrochemical Society Meeting, Symposium I03, [*III-V Surface Validation*](#), N. Gaillard, San Francisco (CA), 2013.

f. University and departmental services

- (9) SOEST/CoE Steering Committee on Materials Science and Engineering (2021), Member: appointed by Dean Morioka and Dean Taylor to establish a formal educational program in Materials Science at UH.
- (8) SOEST's Global Environmental Science Summer Symposium (2021), Reviewer: provided feedback to one student (Jordan Schmidt) on her oral presentation during a practice session. I also reviewed Miss Schmidt's presentation on the day of the Symposium.
- (7) HNEI's Priority Near-Term Hiring Request (2021), Co-chair: co-wrote a 5-page document promoting research at HNEI. This document was reviewed by HNEI IPC and further reduced to 2 pages by HNEI director. The final document will be used by the UH Provost to prioritize future hiring.
- (6) HNEI's Postdoctoral Fellow policy (2020), Chair: established guidelines regarding the transition of HNEI's postdoctoral fellows from a non-employee to RCUH employee status.
- (5) HNEI's Faculty Search position 00853559 (2019), Committee member: reviewed 45 applications for a tenure-track position opened at HNEI.
- (4) UH Undergraduate Showcase (2019), Judge: reviewed the oral presentation of 4 teams of students from the EE department.
- (3) HNEI safety (2017), Reviewer: examined standard operating protocols and other safety-related documents for Drs. M. Dubarry, S. Masutani, T. Reshetenko, G. Severa and J. St-Pierre.
- (2) UH ASUH Scholarship (2013), Reviewer: scored letters of recommendation and personal essays submitted by 9 students to the Associated Students of the University of Hawai'i at Mānoa for scholarships.
- (1) Aloha United Way (2011), HNEI campaign coordinator: raised \$5,800 in donation from HNEI to support those in needs in our local community.

g. Reviewing activities

Reviewer for the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy and Basic Energy Sciences programs, as well as several scientific journals with high impact factors (IF), including *Nature Energy* (IF: 46.5), *Energy and Environmental Science* (IF: 30.3), *Nature Communications* (IF: 14.9), *the Journal of the American Chemical Society* (IF: 15.4) and *the Journal of Material Chemistry A* (IF: 12.7) as well as *Solar Energy Materials and Solar Cells* (IF: 7.2), to name a few (complete list available here: [Link to Publon report](#)).

h. Professional affiliations

- The [U.S. Department of Energy Photoelectrochemical Working Group](#): member since 2008.
- The Electrochemical Society: member since 2008.
- The Materials Research Society: member since 2005.

i. Outreach activities, Guest Lectures and Seminars

- (11) HNEI seminar (Fall'21): *Advanced Materials for Solar Energy Conversion and Storage*.
- (10) Montessori Community School (2020, 4th grade): two 1-hr lessons on Electromagnetism.
- (9) Montessori Community School (2019, 3rd grade): two 1-hr lessons on Acoustics.
- (8) SOEST's *Mauka to Makai* Summer program (Summer2019): a 1-hr Seminar on Renewables.
- (7) Montessori Community School (2018, 2nd grade): two 1-hr lessons on Renewable energies.
- (6) ThinkTech Hawaii (2018): live TV interview regarding my [Research in Photovoltaics and Solar Fuels at HNEI \(Link to video\)](#).
- (5) ThinkTech Hawaii (2017): live TV interview on my group's [Advances in Photovoltaics \(Link to video\)](#).
- (4) ME492 (Spring'18, instructor: M. Dubarry): 1 lecture on solar energy conversion.
- (3) HNEI seminar (Fall'14): *Thin Film Materials for Solar Fuels Generation*.
- (2) GG 711 (Fall'11, instructor: P. Zinin): 1 lecture on *Synthesis and Characterization Methods of Thin Film Materials for Solar Cell Applications*.
- (1) UH/SOEST Open Houses: 2007, 2009, 2011, 2013.

V. PROVISIONAL PATENTS

- (2) [Transparent Free-Standing Thin Film Composites with Tunable Out-of-plane Electrical Conductivity](#), J. Crunk, A. D. Deangelis and N. Gaillard, Provisional patent application, UH Tech ID 20/0028, serial numbers: 63/017,805 (2020), 63/210,162 (2021).
- (1) [Free-Standing Layers for Modular Solid-State Devices](#), A. D. Deangelis, J. Crunk and N. Gaillard, Provisional patent application, UH Tech ID 20/0036, serial numbers: 63/038,660 (2020), 63/210,169 (2021).

VI. GRANTS AND PROPOSALS**a. Funded projects**

- (14) *NSF-PREM: Materials Research and Education Consortium*
Amount awarded: \$800,000 (HNEI share: 46%).
Agency: National Science Foundation-DMR.
Period of performance: 10/2021-09/2024.
Role: co-principal investigator, lead: Dr. Severa.
- (13) *Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES '20)*
Subtask 5.2: Printable Photovoltaics
Amount awarded: \$145,180 (HNEI share: 100%).
Agency: Office of Naval Research.
Period of performance: 04/2021-11/2025.
Role: task leader, lead PI: Dr. Rocheleau.

- (12) *Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES '19)*
Subtask 5.2: Printable Electronic Materials
Amount awarded: \$152,656 (HNEI share: 100%).
Agency: Office of Naval Research.
Period of performance: 04/2020-11/2024.
Role: task leader, lead PI: Dr. Rocheleau.
- (11) *Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES '18)*
Subtask 5.3: Printed Photovoltaics
Amount awarded: \$150,934 (HNEI share: 100%).
Agency: Office of Naval Research.
Period of performance: 03/2019-11/2023.
Role: task leader, lead PI: Dr. Rocheleau.
- (10) *UH Materials Science Consortium for Research and Education*
Amount awarded: \$350,000 (HNEI share: 8%).
Agency: University of Hawaii, strategic investment initiative.
Period of performance: 11/2017-06/2019.
Role: lead principal investigator.
- (9) *Novel Chalcopyrites for Advanced Photoelectrochemical Water-Splitting*
Amount awarded: \$1,113,100 (HNEI share: 68%).
Agency: Department of Energy-Hydrogen and Fuel Cell Technology Office.
Period of performance: 10/2017-12/2021.
Role: lead principal investigator.
- (8) *Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES '16)*
Subtask 2.5: Printed Photovoltaics
Amount awarded: \$216,852 (HNEI share: 100%).
Agency: Office of Naval Research.
Period of performance: 03/2017-06/2021.
Role: task leader, lead PI: Dr. Rocheleau.
- (7) *Wide Bandgap Chalcopyrite Photoelectrodes for Direct Solar Water Splitting*
Amount awarded: \$3,050,000 (HNEI share: 29%).
Agency: Department of Energy-Hydrogen and Fuel Cell Technology Office.
Period of performance: 10/2014-09/2017.
Role: lead principal investigator.
- (6) *Selenide-based Semiconductors as Dual Photoelectrode Approach for Solar Hydrogen*
Amount awarded: \$180,000 (HNEI share: 100%).
Agency: Department of Energy-Hydrogen and Fuel Cell Technology Office.
Period of performance: 10/2014-09/2017.
Role: principal investigator for the UH task, lead: National Renewable Energy Lab.

- (5) *Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES '15)*
Subtask 2.5: Printed Photovoltaics
Amount awarded: \$276,851 (HNEI share: 100%).
 Agency: Office of Naval Research.
 Period of performance: 03/2016-06/2020.
 Role: task leader, lead PI: Dr. Rocheleau.
- (4) *Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES '14)*
Subtask 3.3: Materials for Solar Fuels
Amount awarded: \$276,851 (HNEI share: 100%).
 Agency: Office of Naval Research.
 Period of performance: 01/2015-06/2017.
 Role: task leader, lead PI: Dr. Rocheleau.
- (3) *Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES '13)*
Subtask 3.3: Solar Fuels Production
Amount awarded: \$293,818 (HNEI share: 100%).
 Agency: Office of Naval Research.
 Period of performance: 01/2014-06/2016.
 Role: task leader, lead PI: Dr. Rocheleau.
- (2) *Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES '12)*
Subtask 3.4: Solar Fuels Production
Amount awarded: \$292,587 (HNEI share: 100%)
 Agency: Office of Naval Research.
 Period of performance: 03/2013-09/2015.
 Role: task leader, lead PI: Dr. Rocheleau.
- (1) *Asia Pacific Research Initiative for Sustainable Energy Systems (APRISES '11)*
Subtask 3.4: Low Cost Materials for Solar Fuels
Amount awarded: \$292,101 (HNEI share: 100%).
 Agency: Office of Naval Research.
 Period of performance: 03/2012-06/2014.
 Role: task leader, lead PI: Dr. Rocheleau.

VII. PUBLICATIONS

Source	Type of publications	Citations	h-index
Web of Science	Peer-reviewed only	1511	16
Google scholar	All	2069	20

a. Articles in international refereed journals

- (33) **Invited:** *A Perspective on Ordered Vacancy Compound and Parent Chalcopyrite Thin Film Absorbers for Photoelectrochemical Water Splitting (Featured Article)*, N. Gaillard*, Appl. Phys. Lett **119**, 090501 (2021). <https://doi.org/10.1063/5.0061774>

- (32) *Performance and Limits of 2.0 eV Bandgap CuInGaS₂ Solar Absorber Integrated with CdS Buffer on F:SnO₂ Substrate for Multijunction Photovoltaic and Photoelectrochemical Water Splitting Devices*, N. Gaillard*, W. Septina, J. Varley, T. Ogitsu, K. Ohtaki, H. A. Ishii, J. P. Bradley, C. P. Muzzillo, K. Zhu, F. Babbe and J. Cooper, *Mater. Adv.* **2**, 5752 (2021). <https://doi.org/10.1039/D1MA00570G>
- (31) *In-situ Al₂O₃ Incorporation Enhances the Efficiency of CuIn(S,Se)₂ Solar Cells Prepared from Molecular-Ink Solutions*, W. Septina, C. Muzzillo, C. Perkins, A. Curtis Giovanelli, T. West, K. K. Ohtaki, H. A. Ishii, J. P. Bradley, K. Zhu and N. Gaillard*, *J. Mater. Chem. A* **9**, 10419 (2021). <https://doi.org/10.1039/D1TA00768H>
- (30) *Mg_xZn_{1-x}O Contact to CuGa₃Se₅ Absorber for Photovoltaic and Photoelectrochemical Devices*, I. Kahn, C. Muzzillo, C. Perkins, A. Norman, J. Young N. Gaillard and A. Zakutayev, *Journal of Physics: Energy* **3**, 024001 (2021). doi.org/10.1088/2515-7655/abd3b3
- (29) *Tungsten Oxide-Coated Copper Gallium Selenide Sustains Long-Term Solar Hydrogen Evolution*, D. W. Palm, C. P. Muzzillo, M. Ben-Naim, I. Khan, N. Gaillard and T. F. Jaramillo*, *Sustainable Energy & Fuel* (2021). <https://doi.org/10.1039/D0SE00487A>
- (28) *Assessing the roles of Cu- and Ag-deficient layers in chalcopyrite-based solar cells through first principles calculations (Editor's Pick)*, A. Sharan, F. P. Sabino, A. Janotti, N. Gaillard, T. Ogitsu and J. B. Varley*, *Journal of Applied Physics* **127**, 065303 (2020). <https://doi.org/10.1063/1.5140736>
- (27) *Wide-Bandgap Cu(In,Ga)S₂ Photocathodes Integrated on Transparent Conductive F:SnO₂ Substrates for Chalcopyrite-Based Water Splitting Tandem Devices*, N. Gaillard*, D. Prasher, M. Chong, A. Deangelis, K. Horsley, H. A. Ishii, J. P. Bradley, J. Varley, and T. Ogitsu, *ACS Appl. Energy Mater.* **2** (8), 5515 (2019). <https://doi.org/10.1021/acsaem.9b00690>
- (26) *Molybdenum Disulfide Catalytic Coatings via Atomic Layer Deposition for Solar Hydrogen Production from Copper Gallium Diselenide Photocathodes*, T. R. Hellstern, D. W. Palm, J. Carter, A. D DeAngelis, K. Horsley, L. Weinhardt, W. Yang, M. Blum, N. Gaillard, C. Heske, and T. F Jaramillo*, *ACS Appl. Energy Mater.* **2** (2), 1060 (2019). <https://doi.org/10.1021/acsaem.8b01562>
- (25) *Synthesis of MoS₂ by Treating Molybdenum in H₂S Plasma*, A. Vesel, R. Zaplotnik and N. Gaillard, *Materiali in Tehnologije* **52** (4), 417-421 (2018). <https://doi.org/10.17222/mit.2017.147>
- (24) *Wide Band Gap CuGa(S,Se)₂ Thin Films on Transparent Conductive Fluorinated Tin Oxide Substrates as Photocathode Candidates for Tandem Water Splitting Devices*, A. D. Deangelis, K. Horsley and N. Gaillard*, *The Journal of Physical Chemistry C* **122** (26), 14304 (2018). <https://doi.org/10.1021/acs.jpcc.8b02915>
- (23) *Low-Cost, Efficient and Durable H₂ Production by Photoelectrochemical Water Splitting with CuGa₃Se₅ Photocathodes*, C. Muzzillo*, W. Ellis Klein, Z. Li, A. Deangelis, K. Horsley, K. Zhu and N. Gaillard, *ACS Appl. Mater. Interfaces* **10** (23), 19573 (2018). <https://doi.org/10.1021/acsaami.8b01447>

- (22) *Assessing the role of hydrogen in Fermi-level pinning in chalcopyrite and kesterite solar absorbers from first-principles calculations (Editor's Pick)*, J.B. Varley, V. Lordi, T. Ogitsu, A. DeAngelis, K. Horsley and N. Gaillard, *Journal of Applied Physics* **123**, 161408 (2018). <https://doi.org/10.1063/1.5006272>
- (21) *Antimony (III) Sulfide Thin Films as a Photoanode Material in Photocatalytic Water Splitting*, A. D. DeAngelis, K. C. Kemp, N. Gaillard and K. S. Kim*, *ACS Appl. Mater. Interfaces* **8** (13), 8445 (2016). <https://doi.org/10.1021/acsami.5b12178>
- (20) *Temperature-resistant high-infrared transmittance indium molybdenum oxide thin films as an intermediate window layer for multi-junction photovoltaics*, A. D. DeAngelis*, A. Rougier, J.-P. Manaud, C. Labrugère, E. L. Miller and N. Gaillard, *Solar Energy Materials & Solar Cells* **127**, 174 (2014). <https://doi.org/10.1016/j.solmat.2014.04.029>
- (19) *Predicting a new photocatalyst and its electronic properties by density functional theory*, P. Sarker, D. Prasher, N. Gaillard and M. N. Huda*, *J. Appl. Phys.* **114**, 133508 (2013). <https://doi.org/10.1063/1.4821429>
- (18) *A Nanocomposite Photoelectrode Made of 2.2 eV Band Gap Copper Tungstate (CuWO₄) and Multi-Wall Carbon Nanotubes for Solar-Assisted Water Splitting*, N. Gaillard*, Y. Chang, A. D. DeAngelis, S. Higgins and A. Braun, *Int. Journal of Hydrogen Energy* **38**, 3166 (2013). <https://doi.org/10.1016/j.ijhydene.2012.12.104>
- (17) *Between Photocatalysis and Photosynthesis: Synchrotron spectroscopy methods on molecules and materials for solar hydrogen generation*, D. K. Bora, Y. Hu, S. Thiess, S. Erat, X. Feng, S. Mukherjee, G. Fortunato, N. Gaillard, R. Toth, K. Gajda-Schrantz, W. Drube, M. Grätzel, J. Guo, J. Zhu, E. C. Constable, D. D. Sarma, H. Wang and A. Braun*, *Journal of Electron Spectroscopy and Related Phenomena* **190**, Part A, 93 (2013). <https://doi.org/10.1016/j.elspec.2012.11.009>
- (16) *Soft x-ray and electron spectroscopy to determine the electronic structure of materials for photoelectrochemical hydrogen production*, L. Weinhardt*, M. Blum, O. Fuchs, S. Pookpanratana, K. George, B. Cole, B. Marsen, N. Gaillard, E. L. Miller, K-S. Ahn, S. Shet, Y. Yan, M. M. Al-Jassim, J. D. Denlinger, W. Yang, M. Bär and C. Heske, *Journal of Electron Spectroscopy and Related Phenomena* **190**, Part A, 106 (2013). <https://doi.org/10.1016/j.elspec.2012.11.015>
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- (14) *Effect of thermal treatment on the crystallographic, surface energetics and photoelectrochemical properties of reactively co-sputtered copper tungstate (CuWO₄) for water splitting*, Y. Chang, A. Braun, A. D. DeAngelis, J. Kaneshiro and N. Gaillard*, *J. Phys. Chem. C* **115**, 25490 (2011). <https://doi.org/10.1021/jp207341v>
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- (10) *Advances in Copper-chalcopyrite Thin Films for Solar Energy Conversion*, J. Kaneshiro, N. Gaillard, R. Rocheleau and E. L. Miller*, *Sol. Energy Mater. Sol. Cells* **94**, 12 (2010).
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- (9) *Accelerating materials development for photoelectrochemical hydrogen production: Standards for methods, definitions, and reporting protocols*, Z. Chen, T. F. Jaramillo*, T. G. Deutsch, A. Kleiman-Shwarsctein, A. J. Forman, N. Gaillard, R. Garland, K. Takanebe, C. Heske, M. Sunkara, E. W. McFarland, K. Domen, E. L. Miller, J. A. Turner and H. N. Dinh, *J. Mater. Res.* **25**, 3 (2010). <https://doi.org/10.1557/JMR.2010.0020>
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- (5) *In situ electric field simulation in metal/insulator/metal capacitors*, N. Gaillard*, L. Pinzelli, M. Gros-Jean and A. Bsiesy, *Appl. Phys. Lett.* **89**, 133506 (2006).
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- (4) *Characterization of electrical and crystallographic properties of metal layers at decanometer scale using Kelvin probe force microscope*, N. Gaillard*, D. Mariolle, F. Bertin, M. Gros-Jean, A. Bsiesy, A. Bajolet, S. Chhun and M. Djebbouri, *Microelec. Eng.* **83**, 2169 (2006). <https://doi.org/10.1016/j.mee.2006.09.028>
- (3) *Impact of TiN post-treatment on metal insulator metal capacitor performances*, A. Bajolet*, J.P. Manceau, S. Bruyere, R. Clerc, M. Proust, N. Gaillard, J.C. Giraudin, P. Delpech, L. Montes and G. Ghibaudo, *Microelec. Eng.* **83**, 2189 (2006).
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- (2) *Integration of a high density Ta₂O₅ MIM capacitor following 3D damascene architecture compatible with copper interconnects*, M. Thomas*, A. Farcy, N. Gaillard, C. Perrot, M. Gros-Jean, I. Matko, M. Cordeau, W. Saikaly, M. Proust, P. Caubet, E. Deloffre, S. Crémer, S. Bruyere, B. Chenevier and J. Torres, *Microelec. Eng.* **83**, 2163 (2006). <https://doi.org/10.1016/j.mee.2006.09.027>
- (1) *Cu surface treatment influence on Si adsorption properties of CuSiN self-aligned barriers for sub-65nm technology node*, S. Chhun*, L.G. Gosset, J. Michelon, V. Girault, J. Vitiello, M. Hopstaken, S. Courtas, C. Debauche, P.H.L. Bancken, N. Gaillard, G. Bryce, M. Juhel, L. Pinzelli, J. Guillan, R. Gras, B. Van Schravendijk, J-C Dupuy and J. Torres, *Microelec. Eng.* **83**, 2094 (2006). [10.1016/j.mee.2006.09.013](https://doi.org/10.1016/j.mee.2006.09.013)

b. Peer-reviewed proceedings

- (8) *Development of Chalcogenide Thin Film Materials for Photoelectrochemical Hydrogen Production*, N. Gaillard*, D. Prasher, J. Kaneshiro, S. Mallory and M. Chong, *Materials Research Society Proceedings* **1558**, mrss13-1558-z02-07 (2013). <https://doi.org/10.1557/opl.2013.1084>
- (7) *Development of Metal Tungstate Alloys for Photoelectrochemical Water Splitting*, D. Prasher, M. Chong, Y. Chang, P. Sarker, M. N. Huda and N. Gaillard, *Proc. SPIE 8822, Solar Hydrogen and Nanotechnology VIII*, 88220E (2013). <https://doi.org/10.1117/12.2026464>
- (6) *Copper Tungstate (CuWO₄)-Based Materials for Photoelectrochemical Hydrogen Production*, N. Gaillard, Y. Chang, A. Braun and A. D. DeAngelis, *Materials Research Society Proceedings* **1446**, mrss12-1446-u02-08 (2012). <https://doi.org/10.1557/opl.2012.952>
- (5) *I-III-VI₂ (Copper Chalcopyrite-based) Thin Films for Photoelectrochemical Water-Splitting Tandem-Hybrid Photocathode*, J. M. Kaneshiro*, A. DeAngelis, X. Song, N. Gaillard and E. L. Miller, *Materials Research Society Proceedings* **1324**, mrss11-1324-d15-08 (2011). <https://doi.org/10.1557/opl.2011.964>
- (4) *Status of Research on WO₃-based Photoelectrochemical Devices at the University of Hawai'i*, N. Gaillard, Y. Chang, J. Kaneshiro, A. Deangelis and E. L. Miller, *Proc. SPIE 7770, Solar Hydrogen and Nanotechnology V*, 77700V (2010). [10.1117/12.860970](https://doi.org/10.1117/12.860970)
- (3) *Surface Modification of Tungsten Oxide-Based Photoanodes for Solar-Powered Hydrogen Production*, N. Gaillard*, J. Kaneshiro, E. L. Miller, L. Weinhardt, M. Bär, C. Heske, K.-S. Ahn, Y. Yan and M. Al-Jassim, *Materials Research Society Proceedings* **1171**, 1171-S02-01 (2009). <https://doi.org/10.1557/PROC-1171-S02-01>
- (2) *Development of a Hybrid Photoelectrochemical (PEC) Device with Amorphous Silicon Carbide as the Photoelectrode for Water Splitting*, J. Hu*, F. Zhu, I. Matulionis, T. Deutsch, N. Gaillard, E. L. Miller and A. Madan, *Materials Research Society Proceedings* **1171**, 1171-S03-05 (2009). <https://doi.org/10.1557/PROC-1171-S03-05>

- (1) *Metal Electrodes Work Function Measurement at Deca-Nanometer Scale Using Kelvin Probe Force Microscope: A Step Forward to the Comprehension of Deposition Techniques Impact on Devices Electrical Properties*, N. Gaillard, F. Bertin, A. Bsiesy, M. Gros-Jean and D. Mariolle, *Materials Research Society Proceedings* **917**, 0917-E12-04 (2006). <https://doi.org/10.1557/PROC-0917-E12-04>

c. Book chapters and editorial work

- (5) *Principles, Operations and Techno-Economics of Photovoltaic-Electrolysis and Photoelectrochemical Water Splitting Processes*, N. Gaillard*, Book chapter in “Conversion of Water and CO₂ to Fuels using Solar Energy: Science, Technology and Materials”, **O. K. Varghese** and **F. Leandro de Souza** (Eds.), Wiley (2022). [IBSN: 1119600847](https://doi.org/10.1119600847), submitted.
- (4) *Special Issue: New Materials and Concepts for Solar Energy Conversion and Storage*, N. Gaillard (Ed.), *Energies* (2021). <https://www.mdpi.com/si/76761> (link to be removed after the 17/11/21 deadline)
- (3) *Focus Issue: Advanced Materials and Structures for Solar Fuels*, **A. Braun**, N. Gaillard, **E. Miller** and **H. Wang** (Eds.), *Journal of Materials Research* **31** (11) (2016). <https://doi.org/10.1557/jmr.2016.222>
- (2) *Photoelectrochemical Water Splitting Using Photovoltaic Materials*, N. Gaillard* and A. D. DeAngelis, Book chapter in “Solar to Chemical Energy Conversion”, **M. Sugiyama**, **K. Fujii** and **S. Nakamura** (Eds.), *Lecture Notes in Energy*, Springer (2016). https://doi.org/10.1007/978-3-319-25400-5_16
- (1) *Photoelectrochemical Water Splitting: Standards, Experimental Methods and Protocols*, Z. Chen, T. Deutsch, H. Dinh, K. Domen, K. Emery, A. Forman, N. Gaillard, R. Garland, C. Heske, T. F. Jaramillo, A. Kleiman, E. L. Miller, K. Takanaabe and J. Turner, *SpringerBriefs in Energy*, ISBN: 978-1-4614-8297-0 (2013). [10.1007/978-1-4614-8298-7](https://doi.org/10.1007/978-1-4614-8298-7)

d. Internal reports and other unpublished work

- (12) *UH Materials Science Consortium for Research and Education*, N. Gaillard, H. Ishii, M. Dubarry, J. Brown, S. Shin, P. Dera, K. Sattler, C. Jensen, M. Ghasemi-Nejhad, M. Manghnani, A. Kim, W. Lee, G. Severa, Y. Zuo and J. Bradley, [Final report to the UH Vice Chancellor for Research](#) (2019).
- (11) *Wide Band Gap Chalcopyrite Photoelectrodes for Direct Water Splitting*, N. Gaillard, Final report to the U.S. Department of Energy, [DE-EE0006670](#) (2019).
- (10) *Novel Chalcopyrites for Advanced Photoelectrical Water Splitting*, N. Gaillard, Annual report to the U.S. Department of Energy, [FY19-DE-EE0008085](#) (2019).
- (9) *Novel Chalcopyrites for Advanced Photoelectrical Water Splitting*, N. Gaillard, Annual report to the U.S. Department of Energy, [FY18-DE-EE0008085](#) (2018).
- (8) *Wide Band Gap Chalcopyrite Photoelectrodes for Direct Water Splitting*, N. Gaillard, Annual report to the U.S. Department of Energy, [FY17-DE-EE0006670](#) (2017).
- (7) *Wide Band Gap Chalcopyrite Photoelectrodes for Direct Water Splitting*, N. Gaillard, Annual report to the U.S. Department of Energy, [FY16-DE-EE0006670](#) (2016)

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- (5) *Photoelectrochemical Hydrogen Production*, J. Hu and N. Gaillard, Final report to the U.S. Department of Energy, [FG36-07GO17105](#) (2013).
- (4) *The Viability of Using Tungsten Oxide Based Compounds as a Photoelectrode for the Solar Production of Hydrogen*, N. Gaillard, Y. Li and H. Wang, U.S. Department of Energy Photoelectrochemical Working Group, [White Papers on Materials for Photoelectrochemical Water Splitting](#) (2013).
- (3) *Engineered Ternary and Quaternary Oxide Minerals with Optimal Absorption Characteristics for Solar-Assisted Low-Cost Hydrogen Production*, N. Gaillard and M. N. Huda, U.S. Department of Energy Photoelectrochemical Working Group, [White Papers on Materials for Photoelectrochemical Water Splitting](#) (2013).
- (2) *I-III-VI₂ Copper Chalcopyrites for Photoelectrochemical Water Splitting* J. Kaneshiro, T. Deutsch, N. Gaillard, Z. Chen, A. Kleiman-Shwarscstein, F. Zhu, M. Weir, U.S. Department of Energy Photoelectrochemical Working Group, [White Papers on Materials for Photoelectrochemical Water Splitting](#) (2013).
- (1) *The Viability of Using Amorphous Silicon Carbide (a-SiC) as a Photoelectrode for PEC Hydrogen Production*, J. Hu, F. Zhu, I. Matulionis, J. Gallon, N. Gaillard and T. Deutsch, U.S. Department of Energy Photoelectrochemical Working Group, [White Papers on Materials for Photoelectrochemical Water Splitting](#) (2013).

e. Personal Theses

- (2) *Impact of the Morphological, Electrical and Chemical Properties of Metal/Insulator Interfaces and their Impact on TiN/Ta₂O₅/TiN Capacitors*, N. Gaillard, Matière Condensée [cond-mat]. Université Joseph-Fourier - Grenoble I, Ph.D. Thesis, 2006. (French), [tel-00142484](#).
- (1) *Quantum Effects in Single Electron Transistors*, N. Gaillard, Université Joseph-Fourier - Grenoble I and Nippon Telegraph and Telecom, Master Thesis, 2003 (French), <https://doi.org/10.6084/m9.figshare.11631888.v1>

VIII. PRESENTATIONS

a. Invited conference presentations

- (13) *Potentials and Challenges of Wide Bandgap Copper Chalcopyrite Thin Film Absorbers for Photoelectrochemical Water Splitting Applications*, N. Gaillard, 239th Electrochemical Society Meeting, Symposium I03, [I03-1242](#), Spring Digital Meeting, 2021.
- (12) *Synthesis and Integration of Wide Bandgap Chalcopyrite Candidates for Photoelectrochemical Water Splitting Applications*, N. Gaillard, 238th Electrochemical Society Meeting, Symposium L04, [L04-3091](#), Virtual Conference, 2020.
- (11) *Emerging Chalcopyrite Photo-absorbers for Renewable Hydrogen Production*, N. Gaillard, 236th Electrochemical Society Meeting, Symposium I04, [1909](#), Atlanta (GA), 2019.

- (10) *Wide Bandgap Chalcopyrite-based Photoelectrodes for Renewable Hydrogen Production*, N. Gaillard, European Materials Research Society Spring Meeting, Symposium A, [A.5.6](#), Nice (France), 2019.
- (9) *Wide Bandgap Chalcopyrites for Photoelectrochemical Water Splitting*, N. Gaillard, Materials Research Society Spring Meeting, Symposium ES11, [ES11.05.03](#), Phoenix (AZ), 2019.
- (8) *Wide Bandgap Copper Chalcopyrite Candidates for Renewable Hydrogen Generation*, N. Gaillard, A. D. DeAngelis and K. Horsley, 233rd Electrochemical Society Meeting, Symposium I05, [1884](#), Seattle (WA), 2018.
- (7) *Novel Chalcopyrite Materials for Economical Photoelectrochemical Hydrogen Production*, N. Gaillard, A. D. DeAngelis and K. Horsley, 231st Electrochemical Society Meeting, Symposium I03, [1532](#), New Orleans (LA), 2017.
- (6) *Development of Wide Bandgap Copper Chalcopyrite Materials for Economical Photoelectrochemical Hydrogen Production*, N. Gaillard, A. D. DeAngelis and K. Horsley, 230th Electrochemical Society Meeting, Symposium L04, [3630](#), Honolulu (HI), 2016.
- (5) *Wide Bandgap Copper Indium Gallium Disulfide Thin Film Materials for Photoelectrochemical Hydrogen Production*, N. Gaillard, A. DeAngelis, M. Chong and D. Prasher, 228th Electrochemical Society Meeting, Symposium L06, [1702](#), Phoenix (AZ), 2015.
- (4) *Wide Bandgap Copper Chalcopyrite Materials for Photoelectrochemical Hydrogen Production*, N. Gaillard, 226th Electrochemical Society Meeting, Symposium A08, [574](#), Cancun (Mexico), 2014.
- (3) *High Bandgap Copper Indium Gallium Disulfide Materials For Solar-Assisted Water Splitting*, N. Gaillard, D. Prasher, J. Kaneshiro and M. Chong, J. Hu, M. Weir, and C. Heske, 224th Electrochemical Society Meeting, Symposium I03, [2548](#), San Francisco (CA), 2013.
- (2) *Performance and Limits of 2.2 eV Copper Tungstate (CuWO₄) Mineral for Photoelectrochemical Hydrogen Production*, N. Gaillard, 222nd Electrochemical Society Meeting, Symposium B10, [1741](#), Honolulu (HI), 2012.
- (1) *Status of Research on Tungsten Oxide-based Photoelectrochemical Devices at the University of Hawaii*, N. Gaillard, SPIE Solar Energy and Technology, [77700V](#), San Diego (CA), 2010.

b. Invited program reviews

- (16) *Novel Chalcopyrites For Advanced PEC Water Splitting*, N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD162](#), Virtual meeting, 2021.
- (15) *Novel Chalcopyrites For Advanced PEC Water Splitting*, N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD162](#), (oral presentation cancelled due to COVID-19) 2020.

- (14) *Novel Chalcopyrites For Advanced PEC Water Splitting*, N. Gaillard, DOE Hydrogen Production Tech Team Meeting, Virtual Meeting, 2019.
- (13) *Novel Chalcopyrites For Advanced PEC Water Splitting*, N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD162](#), Crystal City (VA), 2019.
- (12) *Novel Chalcopyrites For Advanced PEC Water Splitting*, N. Gaillard, DOE Hydrogen Production Tech Team Meeting, Virtual Meeting, 2018.
- (11) *Novel Chalcopyrites For Advanced PEC Water Splitting*, N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD162](#), Washington DC, 2018.
- (10) *Wide Bandgap Chalcopyrite Photoelectrodes for Direct Solar Water Splitting*, N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD116](#), Washington DC, 2018.
- (9) *Wide Bandgap Chalcopyrite Photoelectrodes for Direct Solar Water Splitting*, N. Gaillard, DOE Hydrogen Production Tech Team Meeting, Virtual Meeting, 2017.
- (8) *Wide Bandgap Chalcopyrite Photoelectrodes for Direct Solar Water Splitting*, N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD116](#), Washington DC, 2017.
- (7) *Wide Bandgap Chalcopyrite Photoelectrodes for Direct Solar Water Splitting*, N. Gaillard, DOE Hydrogen Production Tech Team Meeting, Virtual Meeting, 2016.
- (6) *Wide Bandgap Chalcopyrite Photoelectrodes for Direct Solar Water Splitting*, N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD116](#), Washington DC, 2016.
- (5) *Wide Bandgap Chalcopyrite Photoelectrodes for Direct Solar Water Splitting*, N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD116](#), Arlington (VA), 2015.
- (4) *Photoelectrochemical Hydrogen Production*, J. Hu and N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD053](#), Arlington (VA), 2013.
- (3) *Photoelectrochemical Hydrogen Production*, J. Hu and N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD053](#), Arlington (VA), 2012.
- (2) *Photoelectrochemical Hydrogen Production*, J. Hu and N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD053](#), Arlington (VA), 2011.
- (1) *Photoelectrochemical Hydrogen Production*, J. Hu and N. Gaillard, DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting, [PD053](#), Washington DC, 2010.

c. Refereed conference presentations

- (33) *Semi-Monolithic Chalcopyrite-Based Multijunction Solar Devices*, N. Gaillard, W. Septina, J. Crunk, K. Outlaw-Spruell and T. West, European Materials Research Society Spring Meeting, Virtual Meeting, [A.II.2](#), (2021).
- (32) *A Transparent Polymer Impregnated with Conductive Particles for Tandem Photovoltaic Devices*, J. Crunk, K. Outlaw-Spruell and N. Gaillard, Materials Research Society Spring Meeting, Joint Symposium EN07/EN06, EN07.01/EN06.01.05, Digital Meeting, 2021.
- (31) *Semi-Monolithic Tandem Solar Cell Architecture for Photoelectrochemical Water Splitting*, K. Outlaw-Spruell, J. Crunk, W. Septina and N. Gaillard, Materials Research Society Spring Meeting, Symposium EN02, EL02.04.04, Digital Meeting, 2021.
- (30) *Emerging Wide Bandgap Chalcopyrites and Integration Methods for Efficient Multijunction Solar Devices*, N. Gaillard, A. Deangelis, W. Septina and J. Crunk, Virtual Chalcogenide PV Conference, Session 01 – Tandems, [0915](#), 2020.
- (29) *First-Principles Simulations of Stability, Optical and Electronic Properties of Competing Phases in Chalcopyrite-Based Photoelectrodes*, J. Varley, A. Sharan, P. Sabino, A. Janotti, T. Ogitsu and N. Gaillard, Materials Research Society Fall Meeting, Symposium EL04, [EL04.10.07](#), Boston (MA), 2019.
- (28) *Atomic Layer Deposited Tungsten-Based Coatings for Durable Solar Hydrogen Production*, D. Palm, C. Muzzillo, N. Gaillard and T. Jaramillo, 236th Electrochemical Society Meeting, Symposium I04, [1899](#), Atlanta (GA), 2019.
- (27) *First-Principles Simulations of Stability, Optical and Electronic Properties of Competing Phases in Chalcopyrite-Based Photoelectrodes*, J. Varley, A. Sharan, T. Ogitsu, A. Janotti, A. Deangelis and N. Gaillard, 235th Electrochemical Society Meeting, Symposium I03, [1627](#), Dallas (TX), 2019.
- (26) *Cu(In,Ga)S₂ Photocathodes with Optical Bandgap Over 1.7 eV for Photoelectrochemical Water Splitting*, K. Horsley, A. Deangelis and N. Gaillard, Materials Research Society Spring Meeting, Symposium EN18, [EN18.15.05](#), Phoenix (AZ), 2018.
- (25) *Integrating Ab-Initio Simulations and Experimental Characterization Methods: Towards Accelerated Chalcopyrite Materials Development for Hydrogen Production*, T. Ogitsu, J. Varley, A. Deangelis, K. Horsley and N. Gaillard, 233rd Electrochemical Society Meeting, Symposium I05, [1855](#), Seattle (WA), 2018.
- (24) *Wide-Bandgap CuGa(S,Se)₂ As Top Cell Photocathodes for Tandem Water Splitting Devices*, A. Deangelis, K. Horsley and N. Gaillard, 233st Electrochemical Society Meeting, Symposium I05, [1929](#), Seattle (WA), 2018.
- (23) *Photoelectrochemical and Solid-State Properties of Wide Bandgap Copper Chalcopyrites for Renewable Hydrogen Generation*, N. Gaillard, K. Horsley and A. Deangelis, Materials Research Society Spring Meeting, Symposium ES7, [ES7.16.02](#), Phoenix (AZ), 2017.
- (22) *Soft X-ray Spectroscopic Investigation of the CdS/Cu(In,Ga)S₂ Interface in Thin Films for Photoelectrochemical Water Splitting*, J. Carter, B. Elizan, M. Blum, K. Horsley, A. DeAngelis, W. Yang, L. Weinhardt, N. Gaillard and C. Heske, Materials Research Society Spring Meeting, Symposium ES7, [ES7.4.04](#), Phoenix (AZ), 2017.

- (21) *First-Principle Simulations in Chalcopyrite Based Photoelectrode Development*, T. Ogitsu, J. Varley, N. Gaillard, C. Heske and M. Blum, 231st Electrochemical Society Meeting, Symposium I03, [1529](#), New Orleans (LA), 2017.
- (20) *Computational Design of Chalcopyrite Photoabsorbers for Photoelectrochemical H₂ Production*, T. Ogitsu, J. Varley, F. Zhou, V. Lordi and N. Gaillard, 230th Electrochemical Society Meeting, Symposium L04, [3635](#), Honolulu (HI), 2016.
- (19) *Non-Precious Metal-Catalyzed Photoelectrodes for Hydrogen Production Via Solar Water Splitting*, T. R. Hellstern, A. D. DeAngelis, L. A. King, P. Chakthranont, R. J. Britto, N. Gaillard and T. F. Jaramillo, 230th Electrochemical Society Meeting, Symposium L04, [3718](#), Honolulu (HI), 2016.
- (18) *Solid-State Characterization of Wide-Bandgap CuGa(S,Se)₂ for PEC Water Splitting*, A. D. DeAngelis, K. Horsley and N. Gaillard, 230th Electrochemical Society Meeting, Symposium L04, [3714](#), Honolulu (HI), 2016.
- (17) *Identifying Optimal Chalcopyrite Alloys for Photoelectrochemical Hydrogen Production through First-Principles*, J. B. Varley, F. Zhou, V. Lordi, T. Ogitsu, and N. Gaillard, Materials Research Society Spring Meeting, Symposium EE2, [EE2.4.01](#), Phoenix (AZ), 2016.
- (16) *Wide-Bandgap Tuneable CuGaSSe Photocathodes for PEC Water Splitting*, A. D. DeAngelis, and N. Gaillard, Materials Research Society Spring Meeting, Symposium EE2, [EE2.4.02](#), Phoenix (AZ), 2016.
- (15) *Efficient Solar-to-Hydrogen Production Materials and Devices*, H. Wang, J. Ager, N. Gaillard, and E. L. Miller, 228th Electrochemical Society Meeting, Symposium L06, [1693](#), Phoenix (AZ), 2015.
- (14) *Development of Wide Bandgap Copper Chalcopyrite Thin Film Materials for Photoelectrochemical Hydrogen Production*, N. Gaillard, A. D. DeAngelis, M. Chong and A. Zeng, Materials Research Society Spring Meeting, Symposium J, [J2-04](#), San Francisco (CA), 2015.
- (13) *Bandgap Optimization of Copper Indium Gallium Disulfide Chalcopyrites for Solar-Assisted Water Splitting*, M. Chong, D. Prasher and N. Gaillard, 225th Electrochemical Society meeting, Symposium F5, [759](#), Orlando (FL), 2014.
- (12) *Development of metal tungstate alloys for photoelectrochemical water splitting*, D. Prasher, M. Chong, Y. Chang, P. Sarker, M. N. Huda and N. Gaillard, Solar Energy and Technology, Solar Hydrogen and Nanotechnology VIII, [88220E](#), San Diego (CA), 2013.
- (11) *Development of Chalcogenide Thin Film Materials for Photoelectrochemical Hydrogen Production*, N. Gaillard, D. Prasher, J. Kaneshiro, S. Mallory and M. Chong, Materials Research Society Spring Meeting, Symposium Z, [Z2-07](#), San Francisco (CA), 2013.
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- (7) *Hybrid Photovoltaic/Photoelectrochemical Device Design Using I-III-VI₂ Copper Chalcopyrite-Based Photocathodes*, J. M. Kaneshiro, Y. Chang and N. Gaillard, 222nd Electrochemical Society meeting, Symposium B10, [1710](#), Honolulu (HI), 2012.
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- (5) *I-III-VI₂ (Copper Chalcopyrite-based) Thin Films for a Photoelectrochemical Water-splitting Tandem-hybrid Photocathode*, J. Kaneshiro, A. Deangelis, N. Gaillard and Eric Miller, Materials Research Society Spring Meeting, Symposium D, [D15-08](#), San Francisco (CA), 2011.
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- (3) *Surface Modification of Tungsten Oxide-Based Photoanodes for Solar-Powered Hydrogen*, N. Gaillard, J. Kaneshiro, E. L. Miller, L. Weinhardt, M. Bär, C. Heske, K. -S. Ahn, Y. Yan and M. M. Al-Jassim, Materials Research Society Spring Meeting, Symposium S, [S02-01](#), San Francisco (CA), 2009.
- (2) *Characterization of Electrical and Crystallographic Properties of Metal Layers at Deca-Nanometer Scale using Kelvin Probe Force Microscopy*, N. Gaillard, D. Mariolle, F. Bertin, M. Gros-Jean, A. Bsiesy, A. Bajolet and S Chhun, Materials for Advanced Metallization Conference, Grenoble (France), 2006.
- (1) *Metal Electrodes Work Function Measurement at Deca-Nanometer Scale using Kelvin Probe Force Microscope: a Step Forward to the Comprehension of Deposition Techniques Impact on Devices Electrical Properties*, N. Gaillard, D. Mariolle, F. Bertin, M. Gros-Jean and A. Bsiesy, Materials Research Society Spring Meeting, Symposium E, [E12-04](#), San Francisco (CA), 2006.

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- (18) *Enhanced Efficiency of Solution-Processed CuIn(S,Se)₂ Solar Cells by In Situ Incorporation of Al₂O₃*, W. Septina, C. Muzzillo, C. Perkins, A. C. Giovanelli, T. West, K. Ohtaki, H. Ishii, J. Bradley, Kai Zhu and N. Gaillard, Materials Research Society Spring Meeting, Symposium EN07, [EN07.909.05](#), Digital Meeting, 2021.
- (17) *High Efficiency Solution-Processed Aluminum-Alloyed Chalcopyrite Thin Film Solar*, W. Septina, T. West, A. C. Giovanelli and N. Gaillard, 238th Electrochemical Society Meeting, Symposium H02, [H02-1908](#), Virtual conference, 2020.

- (16) *Tandem Solar Device Integration Using Transversely Conductive Polymer Composites*, J. Crunk, A. Deangelis and N. Gaillard, 238th Electrochemical Society Meeting, Symposium L04, [L04-3124](#), Virtual conference, 2020.
- (15) *Wide-Bandgap CuGa(S,Se)₂ As Top Cell Photocathodes for Tandem Water Splitting Devices*, A. Deangelis, K. Horsley and N. Gaillard, Materials Research Society Spring Meeting, Symposium EN19, [EN19.04.34](#), Phoenix (AZ), 2018.
- (14) *Monolithic Tandem Devices using Wide-bandgap Chalcopyrite Absorbers for Photoelectrochemical Water Splitting*, K. Horsley, A. DeAngelis, T. Hellstern, T. Jaramillo and N. Gaillard, Materials Research Society Spring Meeting, Symposium [ES14.9.32](#), Phoenix (AZ), 2017.
- (13) *Soft X-ray Spectroscopy of the CdS/Cu(In,Ga)S₂ Interface for Photoelectrochemical Water Splitting*, J. Carter, M. Blum, K. Horsley, A. DeAngelis, W. Yang, D. Hauschild, L. Weinhardt, N. Gaillard, and C. Heske, [Gerischer Electrochemistry Today Symposium](#), Boulder (CO), 2018.
- (12) *Atomic layer deposited coatings for durable (photo)electrochemical hydrogen evolution*, D. W. Palm, T. R. Hellstern, J. Carter, A. DeAngelis, K. Horsley, M. Blum, L. Weinhardt, W. Yang, N. Gaillard, C. Heske, and T. F. Jaramillo, [Gerischer Electrochemistry Today Symposium](#), Boulder (CO), 2018.
- (11) *Activation and stabilization of copper chalcopyrite light absorbers for photoelectrochemical hydrogen production*, D. W. Palm, T. R. Hellstern, N. Gaillard and T. F. Jaramillo, American Chemical Society National Meeting, [ENFL206](#), San Francisco (CA), 2017.
- (10) *Engineering Interfaces for the Activation and Stabilization of Photovoltaic-Grade Thin Film Light Absorbers for Photoelectrochemical Hydrogen Production*, D. W. Palm, T. R. Hellstern, T. F. Jaramillo and N. Gaillard, The American Institute of Chemical Engineers Annual Meeting, [617EY](#), San Francisco (CA), 2016.
- (9) *Engineering Interfaces for Enhanced Carrier Extraction, Stability, and Catalysis in Copper Chalcopyrite Photoelectrochemical Arrays*, D. W. Palm, T. R. Hellstern, N. Gaillard and T. F. Jaramillo, Materials Research Society Fall Meeting, [ES02.09.29](#), Boston (MA), 2017.
- (8) *Ruthenium-Based Materials for Oxygen and Hydrogen Evolution Catalysis in Photoelectrochemical Applications*, Y. Chang, J. M. Kaneshiro and N. Gaillard, 222nd Electrochemical Society Meeting, Symposium B10, [1775](#), Honolulu (HI), 2012.
- (7) *I-III-VI₂ (Copper Chalcopyrite-based) Thin Films for Photoelectrochemical Water-Splitting Tandem-Hybrid Photocathode*, J. M Kaneshiro, A. Deangelis, X. Song, N. Gaillard and E. L. Miller, Material Research Society Spring Meeting, Symposium D, [D15-08](#), San Francisco (CA), 2011.
- (6) *Copper-silver chalcopyrites as top cell absorbers in tandem photovoltaic and hybrid photovoltaic/photoelectrochemical devices*, J. M Kaneshiro, A. Deangelis, N. Gaillard, Y. Chang, J. Kowalczyk and E. Miller, Photovoltaic Specialists Conference, [5614163](#), Honolulu (HI), 2010.

- (5) *Low-temperature indium molybdenum oxide as a window layer in CIGS photovoltaic devices*, A. DeAngelis, J. Kaneshiro, N. Gaillard, Y. Chang, J. Kowalczyk, S. A. Mallory and E. Miller, Photovoltaic Specialists Conference, [5614632](#), Honolulu (HI), 2010.
- (4) *Measurement of the sodium concentration in CIGS solar cells via laser induced breakdown spectroscopy*, J. M. D. Kowalczyk, J. Perkins, J. Kaneshiro, N. Gaillard, Y. Chang, A. DeAngelis, S. A. Mallory, D. Bates and E. Miller, Photovoltaic Specialists Conference, [5615854](#), Honolulu (HI), 2010.
- (3) *Bulk and Surface Engineering of Tungsten Oxide-Based Photoanodes for Solar-Powered Water Splitting*, N. Gaillard, J. Kaneshiro, M. Al-Jassim, C. Heske and E. Miller, 214th Electrochemical Society Meeting, Session B1, [458](#), Honolulu, (HI), 2008.
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