Curriculum Vitae

DOUMON, Nutifafa Yao

Google Scholar

Dept. of Materials Science & Engineering
College of Earth and Mineral Sciences
The Pennsylvania State University
University Park, PA 16802-5013

RESUME: Dedicated, a fast learner, and good problem-solving skills; Teamwork and Leadership skills; Ability to adapt to new environments and work independently; Excellent Negotiation, Organizational, and Communication skills.

EDUCATION

PhD University of Groningen (RuG) – The Netherlands, Applied Physics **2015-2019**
Dissertation: *"The degradation of organic solar cells: from chemistry to device physics through materials"*

MA Honours College University of Groningen – The Netherlands, **2012-2013**
Leadership: Making the difference

MSc University of Groningen – The Netherlands, Nanoscience **2011-2013**

MSc AUST, Abuja – Nigeria, Theoretical Physics **2010-2011**

BSc University of Ghana (UG), Legon – Ghana, Physics **2006-2009**
BSc. (Hon.) 2nd Class Upper

RESEARCH EXPERIENCE

Incoming Assistant Professor of Materials Science and Engineering **2023**
Virginia S. and Philip L. Walker Jr. Faculty Fellow
Affiliate of the Materials Research Institute (MRI) and the Institutes of Energy and the Environment (IEE)
Affiliate of the Alliance for Education, Science, Engineering, and Design with Africa (AESEDA)

PV Characterization and Reliability Scientist, US Department of Energy's **2021**
National Renewable Energy Laboratory (NREL), Golden, CO

Post-Doctoral Research Fellow, INRS-EMT, Varennes, Canada **2020-2021**
Scientific Research Fellow, Jilin Normal University, Changchun, China
Research focuses on materials for solar technologies

Scientific Researcher (Post-Doc.), University of Groningen, The Netherlands **2019-2020**
Research focused on a multidisciplinary approach to materials for applications in various devices.

Researcher • Ph.D. Employee • University of Groningen **2015-2019**
Research topics have been developed independently based on the state of the field and according to the group's interests. Forged a new terrain in the organic/polymer solar cell field, focusing mainly on understanding the degradation mechanisms of the various systems and how to improve the stability of organic solar cells.

Researcher • Master Thesis • University of Groningen **2012-2013**
The research focused on investigating electron transport properties in polymer light-emitting diodes.

Researcher • Master Thesis • AUST-Abuja **2010-2011**
The research focused on the optimization and modeling of contact and adhesion at interfaces in bulk heterojunction solar cells.

Researcher • Bachelor Project • University of Ghana **2008-2009**
The research focused on studies in magnetic hysteresis of metallic glasses for applications in high-voltage transformers.

TEACHING EXPERIENCE

Teaching • University of Groningen **2015-2019**
Topmaster in Nanoscience laboratory class and practical on polymer solar cells;
Supervision, Reports, and Grading of Polymer Chemistry laboratory practical;
Teaching and Tutorials for a series of physics courses, including but not limited to Solar Cells, Structure of Matter II, etc.; Invigilation of exams; Setting and grading assignments and tests;
All these activities measure up to 800 hours+ of teaching and handling more than 500 students.
Finally, I supervised and completed five bachelor and master projects (with students from different continents).

Teaching • Laboratory Assistant • Department of Physics • University of Ghana **2013-2015**
- **Teaching:** Assistant lecturing of 3rd-year bachelor students in Optics (about 20 students); Teaching included Introductory Physics (about 150 students), Electronics, Optics, and supervision of a Bachelor of Science student research project and thesis writing. Invigilation, Tutorials, and Grading of assignments and exams.
- **Laboratory:** First-year bachelor general physics laboratory supervision (about 750 students).

Teaching assistant in Innovation class • AUST **2011**
Assisting in lecturing/translating some of Prof. Soboyejo's class in French to the Francophone master's degree students (about 20 students) from C2I of Burkina Faso in AUST-Abuja

National Service • Department of Physics • University of Ghana **2009-2010**
- **Teaching:** 3rd and 4th-year bachelor students (Electronics and Optics, about 50 students); Helped final year BSc students with their research projects and report writings. Invigilation, Tutorials, and Grading of assignments and exams.
- **Laboratory:** First and third-year (about 700 and 30 students) bachelor general physics laboratory, and Final year (about 25 students) bachelor Electronics laboratory supervision

French Teacher • Star of the East JHS & Careplan Int. School **2003-2008**
Teaching the French language to primary pupils and junior high school students, first for three years full-time and later as part-time for two years.

Masters students supervised
- **Félix Houard**, "Relating the chemical structure of ITIC derivative acceptors and the active layer system to the photostability of organic solar cells.", Graduated in **06/2019**

- **Panagiotis Christodoulis**, "Ternary blend organic solar cells for improved photostability.", Graduated in **06/2018**

Bachelor students supervised
- **Mikhail Dryzhov**: a."Fullerene and Non-Fullerene organic solar cells, the role of the acceptor molecule in photo-induced degradation.", Graduated in **06/2018**
  b. "The effect of additives on the performance of organic solar cells: the case of DIO and non-fullerene solar cells.", Graduated in **12/2017 Honours College Bachelor Degree**

- **Martijn Oudshoorn**, "Study of electronic traps in organic semiconductors via thermally stimulated current technique.", Graduated in **06/2016**

- **Samuel Owusu Nti**, "Concentration dependence of the refractive index of sugar solutions using laser and diffraction grating (application to local beverages).", Graduated in **05/2014**

RECOGNITIONS/SCHOLARSHIPS/AWARDS

Academic Highlights **2021**
Two publications made it to Theme collections:
- J. Mater. Chem. C 2019, 7, 5104 Editors' choice collection on organic photovoltaics: back in the game for both RSC J. Mater. Chem. and Mater. Adv.
- Mater. Adv., 2020, 1, 1866 Themed Collection "Perovskites, 2021" for RSC Mater. Adv.

Mitacs Accelerate Fellowship (IT19876) **2020**
Co-applicant of the grant: funding that, together with Pi-Sol Technologies, would help train a student on how to stabilize perovskite inks for optoelectronics devices.

RuG 3 Minutes Thesis Competition **2019**
People's Choice Award (Certificate & 250.00 Euros). This led to a feature of my work on *"Organic solar cells"*- The video interview on the university webpage. Notably, a message well delivered to almost *150* people.

Outstanding Executive Member: African Students Community, RuG (2011-2013) **2015**

Talents Feature **2013**
Talents in the Spotlight in NRG (Energy) Magazine 9th Edition (pages 22 -24)

Topmaster in Nanoscience Scholarship **2011**
Scholarship awarded by Zernike Institute for Advanced Materials to study in their master's program. Since 2013, the program has been voted the Best university master's degree program in The Netherlands each year

Dr. Ngozi Okonjo-Iweala Scholarship **2010**
AUST-Abuja: Scholarship for master's degree at one of the Nelson Mandela Institutes. This scholarship was combined with the **scholarship from the African Development and World Banks**

Best Graduating Final Year Physics Student, University of Ghana, Legon **2009**

Outstanding Member: Physics students' association of Ghana (PHYSAG), UG-Chapter **2008**

PUBLICATIONS

Thesis/Books

Montgomery, A.; **Doumon, N. Y.;** Torrence, C.; Schelhas, L. T.; King, B.; Stein, J. "Metal-Halide Perovskite Solar Modules – The challenge of upscaling and commercializing this technology" (*Book Chapter: In preparation*)

Doumon, N. Y., The degradation of organic solar cells: from chemistry to device physics through materials, Groningen: University of Groningen, 2019. ISBNs 978-94-034-2021-9, e-ISBNs 978-94-034-2020-2, doi:10.33612/diss.98539626

Journal article publications

Doumon, N. Y.; Yang, L.; and Rosei, F.; "Ternary Organic Solar Cells: A Review of The Role of the Third Element", Nano Energy **2022**, 94,106915, https://doi.org/10.1016/j.nanoen.2021.106915.

Asare, J.; Sanni, D. M.; Agyei-Tuffour, B.; Agede, E.; Oyewole, O. K.; Yerramilli, A. S.; and **Doumon, N. Y.**; "A Hybrid Hole Transport Layer for Perovskite-based Solar Cells", Energies **2021**, 14(7), 1949. Special Issue Advanced Polymer and Perovskite Solar Cells

Asuo, I. M.; Gedamu, D.; **Doumon, N. Y.**; Ka, I.; Pignolet, A.; Cloutier, S. G.; and Nechache, R. "Ambient Processing Strategy for Improved Air-Stability and Efficiency in Mixed-Cation Perovskite Solar Cells", Mater. Adv., **2020**, 1, 1866—1876. Themed Collection "Perovskites, 2021"

Abdu-Aguye, M.*; **Doumon, N. Y.***; Terzic, I.; Dong, J.; Portale, G.; Loos, K.; Koster, L. J. A.; and Loi, M. A.; "Can Ferroelectricity improve organic solar cells?", Macromol. Rapid Commun. **2020**, 2000124.

Rousseva, S.; den Besten, H.; Doting, E.; **Doumon, N. Y.**; Douvogianni, E.; Koster, L. J. A.; and Hummelen, J. C.; "Reaching a Double-Digit Dielectric Constant With Fullerene Derivatives", J. Phys. Chem. C **2020**, 124, 8633−8638.

Doumon, N. Y.; Houard, F. V; Dong, J.; Yao, H.; Portale, G.; Hou, J.; Koster, L. J. A.; "Energy level modulation of ITIC derivatives: Effects on the photodegradation of conventional and inverted organic solar cells", Org. Elec., **2019**, 69, pp 255-262.

Doumon, N. Y.; Houard, F. V; J. Dong; Christodoulis, P.; Dryzhov, M. V.; G. Portale; Koster, L. J. A.; "Improved Photostability in Ternary Blend Organic Solar Cells: The Role of [70]PCBM", J. Mater. Chem. C **2019**, 7, 5104–5111. Editors' choice collection on organic photovoltaics: back in the game

Doumon, N. Y.; Wang, G.; Qiu, X.; Minnaard, A. J.; Chiechi, R. C.; Koster, L. J. A.; "1,8-Diiodooctane Acts as a Photo-Acid in Organic Solar Cells", Nature Sc. Reports, **2019**, 9 (1), 4350.

Ye, G.; **Doumon, N. Y.**; Rousseva, S.; Liu, Y.; Abdu-Aguye, M.; Loi, M. A.; Hummelen, J. C.; Koster, L. J. A.; Chiechi, R. C.; "Conjugated Polyions Enable Organic Photovoltaics Processed from Green Solvents", ACS Appl. Energy Mater., **2019**, 2 (3), 2197–2204.

Doumon, N. Y.; Dryzhov, M. V; Houard, F. V; Le Corre, V. M.; Chatri, A. R.; Christodoulis, P.; Koster, L. J. A.; "Photostability of Fullerene and Non-Fullerene Polymer Solar Cells: The Role of the Acceptor", ACS Appl. Mater. Interfaces, **2019**, 11 (8), 8310.

Doumon, N. Y.; Koster, L. J. A.; "Effects of the Reduction and/or Fluorination of the TT-Units in BDT-TT Polymers on the Photostability of Polymer:Fullerene Solar Cells", Sol. RRL **2019**, 1800301.

Le Corre, V. M.; Chatri, A. R.; **Doumon, N. Y.**; Koster, L. J. A.; "Response to comments on Charge Carrier Extraction in Organic Solar Cells Governed by Steady-State Mobilities", Adv. Energy Mater. **2018**, 7 (22), 1803125.

Agyei-Tuffour, B.; **Doumon, N. Y.**; Rwenyagila, E. R.; Asare, J.; Oyewole, K.; Shen, Z.; Petoukhoff, C. E.; Zebaze Kana, M. G.; Ocarroll, D. M.; Soboyejo, W. O.; "Pressure Effects on Interfacial Surface Contacts and Performance of Organic Solar Cells", J. Appl. Phys. **2017**, 122 (20), 205501.

Zhou, D.; **Doumon, N. Y.**; Abdu-Aguye, M.; Bartesaghi, D.; Loi, M. a.; Anton Koster, L. J.; Chiechi, R. C.; Hummelen, J. C.; "High-Quality Conjugated Polymers via One-Pot Suzuki-Miyaura Homopolymerization", RSC Adv. **2017**, 7 (44), 27762–27769.

Doumon, N. Y.; Wang, G.; Chiechi, R. C.; Koster, L. J. A.; "Relating Polymer Chemical Structure to the Stability of Polymer:Fullerene Solar Cells", J. Mater. Chem. C **2017**, 5 (26), 6611.

Le Corre, V. M.; Chatri, A. R.; **Doumon, N. Y.**; Koster, L. J. A.; "Charge Carrier Extraction in Organic Solar Cells Governed by Steady-State Mobilities", Adv. Energy Mater. **2017**, 7 (22), 1701138.

Abbaszadeh, D.; Wetzelaer, G.-J. A. H.; **Doumon, N. Y.**; Blom, P. W. M.; "Efficient Polymer Light-Emitting Diode with Air-Stable Aluminum Cathode", J. Appl. Phys. **2016**, 119 (9), 1–7.

Abbaszadeh, D.; **Doumon, N. Y.**; Wetzelaer, G.-J. A. H.; Koster, L. J. A.; Blom, P. W. M.; "Effect of the Layer Thickness on the Efficiency Enhancement in Bilayer Polymer Light-Emitting Diodes", Synth. Met. **2016**, 215, 64–67.

Conference papers (Abstract-reviewed)

Abdu-Aguye, M.*; **Doumon, N. Y.***; Terzic, I.; Voet, V.; Loos, K.; Koster, L. J. A.; and Loi, M. A. Photophysical properties of semiconducting-ferroelectric block copolymers for organic photovoltaics, **2018**, DOI: 10.29363/nanoge.hopv.2018.152

PRESENTATIONS/INVITED TALKS

Invited Talks:

5th ACerS ESHM Meeting (Invited Talk) "Indoor/Outdoor Performance Tracking of Metal-Halide Perovskite Photovoltaic Modules" **09/2022**

Next-Generation Solar Energy, "Challenges Faced by Emerging (Organic) Photovoltaic Technologies" (Invited Talk) **04/2022**

National Renewable Energy Laboratory (NREL), Golden, CO–USA (Invited Talk) "Emerging (Organic) Photovoltaic Technologies" **09/2021**

Institut National de la Recherche Scientifique, Varennes, Canada (Invited Talk) "Photo-Degradation Of Organic Solar Cells" **05/2019**

Ecole de Technologies Supérieures, Montréal, QC – Canada (Invited Talk) "Photodegradation Of Organic Solar Cells: From Chemistry to Device Physics Through Materials" **05/2019**

Pratt Sch. of Eng., Duke University, Durham, NC-USA (Invited Talk) "Degradation Of Organic Solar Cells: From Chemistry to Device Physics Through Materials" **10/2018**

Department of Physics Seminar, University of Ghana (Invited Talk) **2013**

Selected Oral Presentations: Public or Guest speaker

2022 MRS Fall Meeting, Boston-Massachusetts, USA (Abstract accepted for Talk) **12/2022**

2019 MRS Spring Meeting, Phoenix-Arizona, USA (Talk) **04/2019**
ES18.03.03: Photo-Stability of Organic Solar Cells—Fullerene vs. Non-Fullerene Polymer Solar Cells

University of Groningen 3-Minute-Thesis-Competition **03/2019**
Presentation to a non-specialist audience on organic solar cells

2018 MRS Fall Meeting, Boston-Massachusetts, USA (Talk) **12/2018**
EP05.01.03: Conjugated Polyions—Charged Semiconducting Polymers Processed from Protic Solvents

9th International 2017 A-MRS Conference, Gaborone, Botswana (Talk) – **12/2017**
EO 38: Photostability of polymer-fullerene and polymer-nonfullerene solar cells: The effect of UV on the material chemical structure and DIO in the active layer

E-MRS 2017 Spring Meeting, Strasbourg, France (Talk) **05/2017**
L.1.2: Performance of Alkylthyenyl BDT-TT and Alkoxy BDT-TT polymers in polymer:fullerene solar cells: Efficiency and UV-Stability

60 seconds Research/Thesis presentation Zernike Biannual Vleland Meeting **04/2017**

E-MRS 2016 Fall Meeting, Warsaw, Poland (Talk) **09/2016**
R.11.1: Relating polymer chemical structure to the stability of polymer:fullerene solar cells

Selected Poster Presentations

E-MRS 2018 Spring Meeting, Strasbourg, France	**06/2018**
LMPV 2018 Mini-Conference, Amsterdam, The Netherlands	**06/2018**
Physics@Veldhoven 2018, Veldhoven, The Netherlands	**01/2018**
Next generation PV Materials III, Groningen, The Netherlands	**07/2017**
Biannual Vlieland 2017 Meeting, Groningen, The Netherlands	**05/2017**
FOM Veldhoven (Physics) Conference, The Netherlands	**01/2016**
Next Generation OPV-II, Groningen, The Netherlands	**07/2015**

TRAINING/WEBINARS/WORKSHOPS/CERTIFICATES

Training

MOOC Courses:

- Energy: Thermodynamics in Everyday Life;
- Education for All – Disability, Diversity, and Inclusion; and
- Solving the Energy Puzzle: A Multidisciplinary Approach to Energy Transition

Webinars

IOP's Women in Science, The Role of Solar Technologies in Sustainable Development	**10/2021**
West Africa Civil Society Institute Virtual Conference: Southern CSOs' Perspectives on Localization, Domestic Resources Mobilisation, and Shift the Power	**09/2021**
MRS – Global Diversity Month: Intersections of Underrepresentation in Materials Science and Engineering	**10/2020**
MRS – Global Diversity Month: Understanding Unconscious Bias	**10/2020**
RSC – Black History Month: Inclusion & Diversity in Chemistry	**10/2020**
Education Collaborative Virtual Conference, Accra, Ghana	**06/2020**

Workshops

2022 Perovskite PV Accelerator for Commercializing Technologies workshop	**10/2022**
Multi-level integrated adaptation governance workshop-Climate Change Participation and volunteer notetaker at GIMPA, Accra – Ghana	**04/2014**

Certificates

- **Celebrating Black History Month organized by Chemistry World Webinars** **10/2020**

Webinar certificate delivered by the Royal Society of Chemistry

- **DALF C2 French Language Proficiency – C2 Level Proficiency** **08/2020**

Diplôme Approfondi de Langue Française délivré par CIEP Ministère de l'Education – France

- **IELTS English Language Proficiency (CERF C1 Level Proficiency)** **08/2020**

English Language Certificate delivered by the British Council in connection with Cambridge Assessment English

- **Certificate: Solving the Energy Puzzle: A Multidisciplinary Approach to Energy Transition** **01/2019**

Online Course MOOC certificate delivered by the University of Groningen in connection with FutureLearn

PROFESSIONAL SERVICE

Peer-reviewed articles for:

- ACS Applied Materials & Interfaces
- AIP Applied Physics Letters

- Elsevier Organic Electronics RSC
- Journal of Materials Chemistry A
- Springer Nature Scientific Reports
- Wiley Advanced Energy Materials
- Wiley Progress in Photovoltaics
- Wiley Solar RRL
- IEEE Journal of Photovoltaics

Conference Organisation and Participation

- **Volunteer for Next-Gen. IV: PV Materials Conference Organization, Groningen 2019**

As a student volunteer, it was my job to make sure the day went well in terms of the venue; daily participants' registration; arrangements of the speakers, their slides, and manipulation of their PA system; etc.

- **Symposium on Education and Research in Africa, Groningen 2017**

Part of a Three-Panel Member: Discussion on Education and Research in Africa.
The targeted audience was the international student body in The Netherlands and local communities.

- **Host/Main organizer: 2013 RuG ASC Symposium on Africa, Groningen 2013**

Symposium entitled "Africa: The spirit of Union in Diversity." It covered topics such as Tourism, Entertainment, Education, Science, Research, History, Economy, International Criminal Court, etc. The targeted audience was students, Africans, and local communities.

PROFESSIONAL AFFILIATIONS

American Ceramic Society – Energy Materials & System	**2022**
Materials Research Society	**2016-present**
African Materials Research Society	**2017-present**

COMMUNITY SERVICE/LEADERSHIP

Energy Mentor	**2022**
Initiator and Coordinator of DAMINY EduNergy Mentorship Program (DENMP)	**2021**
Mentor under the DENMP initiative for Africa	**2021**
Co-Founder of DAMINY EduNergy Ltd	**2021**
RuG Alumni Ambassador, Ghana, and West Africa	**2013-Present**
Finalist RuG 2019 3 Minutes Thesis Competition, Groningen	**2019**
Active Member African Students Community (ASC), Groningen	**2015-2019**
Mentor, speed dating Academia: Pick Your Own-talent/Master Your Excellent Talent	**2015-2017**
Acting Chair: E-MRS 2016 Fall Meeting, R, Perovskites solar cells V, Warsaw	**2016**
Member, Groningen International Students Platform	**2011-2013**
President, African Students Community (ASC) – RuG	**2011-2013**
Member, Nanoscience course committee, Groningen	**2011-2012**
Member ROSEN-Europe Team Finalist Intl. NRG Battle, Groningen	**2012**
Physics Stream Representative on AUST Welfare Committee	**2010-2011**
Member of STEM – AUST Project, Abuja	**2010-2011**

LANGUAGES

Ewe: Native language

Dutch: A1 level

English: Advanced level (C1) Proficiency on the British council IELTS scale
Listening: **Expert user**; Speaking: **Expert user**; Reading: **Very Good user**; and Writing: **Good user**

French: Utilisateur Expérimenté, C2 Proficient level (DALF C2 level) on the CIEP language scale
Listening: **Expert user**; Speaking: **Expert user**; Reading: **Expert user**; and Writing: **Expert user**

SKILLS

Computer Skills: Basic Python and MATLAB, Google Workplace, Microsoft Teams, Zoom, Microsoft Office, Data Analysis

Laboratory skills: Cleanroom, spin-coating, glovebox, and solar simulator experience; fabrication and characterization (including PV parameters, EQE, stability, etc.) of organic/polymer solar cells and LEDs; characterization of thin films; etc.

Soft Skills: Presentation skills; Public speaking skills; Report Writing; Publishing in English; Peer-review and editing skills; Broad knowledge about Energy, Environment, Climate change, Energy Transition, and environmental hazards

Management Skills & Experience: Initiation, planning, coordination, and execution of many projects, groups, and group activities as a scientist, a leader of ASC Groningen-The Netherlands, and the Catholic students Union, Taifa-Ghana. Currently leading, initiating, and coordinating the activities of DAMINY EduNergy Ltd and the DENMP.

OTHER: INTERESTS/HOBBIES

My main interests are making a difference, positively impacting lives, and solving real-life problems. Field of interest: Physics, Nanoscience, and Nanotechnology, understanding nanostructured materials for energy and optoelectronic devices; Science of Renewable Energy; Solar Energy; Energy Transition; Climate Change and Global Warming; Leadership; and Education. Other interests lie in following news worldwide, scientific innovation, music, reading, traveling, soccer, and tennis.