

PERSONAL INFORMATION

Name Marlene Susana Arrechea Alvarado
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 Date of birth 03/13/1988
 Nationality Guatemalan
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**EDUCATION AND TRAINING**

2011-2015 PhD in Nanoscience and Nanotechnology, *CUM LAUDE*. Institute of Nanoscience, Nanotechnology and Molecular materials, University of Castilla La-Mancha, Toledo, Spain, Av. Carlos III S/N, Toledo, Spain. www.uclm.es, Fundación Carolina Scholarship.
 2011-2013 Master in Nanoscience and Nanotechnology, Final Project with honors. Universities: Universidad Autónoma de Madrid, Universitat de València (Coordinator), Universitat d'Alacant, Universidad de Valladolid, Universitat Jaume I de Castellon, Universidad de Castilla la Mancha, and Universidad de La Laguna. <http://www.icmol.es/master/nnm/> Fundación Carolina Scholarship.
 2005-2010 Chemical Engineer, Faculty of Engineering, University of San Carlos de Guatemala. T-5 Ciudad Universitaria, z 12. Guatemala City. <https://www.ingenieria.usac.edu.gt/>.

RESEARCH EXPERIENCE

Aug 2021-October 2021

Principal Investigators: Susana Arrechea, Kleinsy Bonilla, Claudia Romero, Nereyda Ortiz. Engaging the Guatemala Science Diasporas for Development: Network building and shared learning, funded by INASP contract No.0652021.

Jan 2018- September 2020

Principal Investigator, Chemical Engineering School, Faculty of Engineering, University of San Carlos de Guatemala "Functionalization and characterization of multi-wall carbon nanotubes with aminothiazole for the evaluation of the mechanical properties of a novel Portland cement composite" funded by TWAS Research Grants No. 17-401 RG/CHE/LA_I – FR3240297756.

Oct 2016- January 2020

Project Coordinator and Researcher University of San Carlos de Guatemala (Co-Beneficiary/Partner), "Free Fostering REsearch-based Entrepreneurship and the development of spin-off companies in Central America/FREE Network". Coordinating Organization/Beneficiary PIC 999895886 Universidad de Alicante, Spain. Project number 573971-EPP-1-2016-1-PA-EPPKA2-CBHE-JP funded by European Union Erasmus+ <http://freenetwork-project.eu/>.

Mar 2017- July 2019

Researcher and Guatemalan project coordinator, Chemical Engineering School, University of San Carlos de Guatemala (Partner). "Caribbean-European Union Research Alliance 4 Better Waste". Coordinating Organization/Beneficiary: Fraunhofer Society, Germany.

Project Number, 0133-106399/833363, funded by European Union Eranet-Lac.
<http://care4waste.net/>.

Jan 2017- Dec 2018

Guatemalan Investigator, University of San Carlos de Guatemala, Researcher, Chemical Engineering School, "Contribution of nanomaterials to the development of socio-environmental welfare in Guatemala". Coordinating Organization: Institute of Construction Sciences Eduardo Torrojas, Spain. Reference COOPB20241, funded by National Council of scientific research CSIC, Spain.

Aug 2015- July 2017

Principal Investigator, USAC, Researcher, Chemical Engineering School, Faculty of Engineering, University of San Carlos de Guatemala. "Material Engineering and Nanotechnology for Sustainable Development". Project Multicyt 03-2016. Funded by Cementos Progreso, Guatemalan National Science Secretariat and Guatemala City Hall.
<https://especializacionnan.wixsite.com/2016nanogt>.

May 2014- May 2016

FULBRIGHT-NEXUS Fellow, Visiting researcher Nov 2015 to May 2016. University of California, Berkeley, Energy and resources Group, Microgrids for rural communities, Prof. Daniel Kammen, PI, <https://rael.berkeley.edu/> <http://www.cies.org/program/fulbright-nexus-regional-scholar-program>.

Sept 2011- Nov 2015

Researcher, PhD student "Porphyrins for bulk heterojunction solar cells and dye sensitized solar cells", Advisor: Prof. Fernando Langa, PI, Institute of Nanoscience, Nanotechnology and Molecular materials, (INAMOL), University of Castilla La-Mancha, Toledo, Spain. Funded by Fundación Carolina Scholarship.

<https://previa.uclm.es/grupo/nanomateriales/about.html>.

Nov -Dec 2014

Researcher, "Bulk heterojunction solar cells devices preparation", Advisor: Prof. Emilio Palomares, Institute Catalan of Chemical Research (ICIQ), Tarragona, Spain.

TEACHING EXPERIENCE

June 2009-Nov 2018, Universidad de San Carlos de Guatemala

- Professor of Scientific Publication, (140 students of Research Specialization), Master and Postgraduate School, Faculty of Engineering (Sep-Nov 2018).
- Professor of protocol revisions, (70 students of Research Specialization), Master and Postgraduate School, Faculty of Engineering (Sep-Nov 2018).
- Professor of Physics, (150 medicine students), Faculty of Medicine, (Jan 2016-Mar 2016).
- Professor of Supramolecular Chemistry, (10 engineering students), Faculty of Engineering (Sept 2011-Jun 2013).
- Professor of Physical Chemistry, summer course (30 students), Faculty of Engineering (Jun 2013).
- Professor of Physical Chemistry, (40 students), Faculty of Engineering (Jul 2010- Dec 2011).

- Professor Assistant, Chemical Engineering School, Faculty of Engineering, (Jul 2009- Jun 2010).

Jan 2017- Dec 2017, Universidad del Valle de Guatemala

- Professor of Megaproject 2 and 3, (6 biochemistry students), Department of Biochemistry and Microbiology.

OTHER PROFESSIONAL EXPERIENCE (NON-ACADEMIC)

April 2017- New Sun Road <https://www.newsunroad.com/>

- Digital Community Centers Stellar Ixq-Saq'è (February 2021-June 2022), Project Director, grant through DAI, founded by USAID under the initiative USAID-Microsoft. Main goal is increase economic opportunities for indigenous women in Guatemala's rural areas by providing access to electricity, Internet connectivity, and digital skills training.
- Global Projects Coordinator, solar electricity, connectivity and digital literacy for rural communities in Central America (July 2020-January 2021)
- Co-founder of New Sun Road Guatemala S.A. (Local company, July 2019)
- Volunteer Guatemala Coordinator. Project in Aldea Llano Grande, Santa Rosa, Guatemala (April 2017-July 2020). <https://www.youtube.com/watch?v=-GxGx3-wbc&t=7s>.

PUBLICATIONS PEER-REVIEWED

Nanotubes for improving the properties of cement-based materials (a collaboration between academy and industry in Guatemala)

1. Effect of additions of multiwall carbon nanotubes (MWCNT, MWCNT-COOH and MWCNT-Thiazol) in mechanical compression properties of a cement-based materials. Arrechea, S.; Guerrero-Gutiérrez, E. M.A.; Velásquez, L.; Cardona, J; Posadas, R.; Callejas, K.; Torres, S.; Díaz, R.; Barrientos, C.; García, E. *Materialia*, 2020, 11, 100739. <https://doi.org/10.1016/j.mtla.2020.100739>.

Novel materials based on porphyrins for solar cells of third-generation (Bulk Heterojunction Solar Cells and Dye-Sensitized Solar Cells)

2. New cyclopentadithiophene (CDT) linked porphyrin donors with different end-capping acceptors for efficient small molecule organic solar cells. Arrechea, S.; Aljarilla, A.; de la Cruz, P.; Kumar, P.; Sharma, G. D.; Langa, F. *J. Mater. C*. 2017, 5, 4742. <https://doi.org/10.1039/C7TC00812K>
3. Efficiency Improvement Using Bis(trifluoromethane) Sulfonamide Lithium Salt as Chemical Additive in Porphyrin Based Organic Solar Cells. Arrechea, S.; Aljarilla, A.; de la Cruz, P.; Palomares, E.; Sharma, G. D.; Langa, F. *Nanoscale*, 2016, 8, 17953. <https://doi.org/10.1039/C6NR06374H>
4. High Photo-Current in Solution Processed Organic Solar Cells Based on Porphyrin Core A-<pi>-D-<pi>-A as Electron Donor Material. Montcada, N. F.; Arrechea, S.; Molina-Ontoria A.; Aljarilla, A. I.; de la Cruz, P.; Echegoyen, L.; Palomares, E.; Langa, F. *Organic Electronics*, 2016, 38, 330. <https://doi.org/10.1016/j.orgel.2016.09.003>
5. CuSCN as selective contact in solution-processed small-molecule organic solar cells leads to over 7% efficient porphyrin-based device. Mórán, G. ; Arrechea, S. ; de la Cruz, P. ; Cuesta, V. ; Biswas, S. ; Palomares, E. ; Sharma, G. D. ; Langa, F. *J. Mater. Chem. A*, 2016, 4, 11009. <https://doi.org/10.1039/C6TA04369K>
6. Charge Recombination Losses in Thiophene-Substituted Porphyrin Dye-Sensitized Solar Cells. Arrechea, S.; Clifford, J. N.; Pelleja, L.; Aljarilla, A.; de la Cruz, P.; Palomares, E.; Langa, F. *Dyes Pigm.* 2016, 126, 147. <https://doi.org/10.1016/j.dyepig.2015.11.002>

7. Effect of porphyrin loading on Dye Sensitized Solar Cell performance based on iodide/tri-iodide and cobalt electrolytes. Aljarilla, A.; Clifford, J. N.; Pelleja, L.; Moncho, A.; Arrechea, S.; de la Cruz, P.; Langa, F.; Palomares, E. J. Mater. Chem. A. 2013, 1, 13640. <https://doi.org/10.1039/C3TA12955A>
8. New Acceptor- π -Porphyrin- π -Acceptor Systems for Solution-Processed Small Molecule Organic Solar Cells. Arrechea, S.; Molina-Ontoria, A.; Aljarilla, A.; de la Cruz, P.; Langa, F.; Echegoyen, L. Dyes Pigm. 2015, 121, 109. <https://doi.org/10.1016/j.dyepig.2015.04.037>
9. Push-Pull cromophores based on triphenylamine as photosensitizers and electron donors for molecular solar cells. Aljarilla, A.; Herrero-Ponce, P.; Atienzar, P.; Arrechea, S.; de la Cruz, P.; L.; Langa, F.; García, H. Tetrahedron. 2013, 69, 6875. <https://doi.org/10.1016/j.tet.2013.05.137>

Sustainability for providing electricity through microgrids in rural communities

10. Methodology for Monitoring Sustainable Development of Isolated Microgrids in Rural Communities. Rahmann, C.; Núñez, O.; Valencia, F.; Arrechea, S.; Sager, J.; Kammen, D. Sustainability 2016, 8, 1163. <https://doi.org/10.3390/su8111163>

MEMBERSHIP IN ACADEMIES AND SOCIETIES

1. Full member Organization for Women in Science in Developing Countries since May 2018. Board member con co-founder of Guatemalan Chapter March 2020 Co-founder of the mentorship program and Coordinator of the group “STEAM for girls and boys”. <https://owsd.net/member/arrechea-susana>
2. Member of Academy of Medical, Physical and Natural Science of Guatemala since 2018.
3. Member of the International Network of Scientists of Guatemala since 2017. Collaboration in the biggest academic event in Guatemala Convergencia 2017, 2018 and 2019. International Coordinator 2020-2022.
4. Inter-sectoral Biotechnology Commission 2017-2019. Vice-president on the Board from January to December 2019. Co-organizer of Biotechnology congress 2018, 2019.
5. Member of Nanotechnology Network “José Roberto Leite” de divulgación y formación en nanotecnología, Nov 2016.
6. Member of Affordable Energy for Humanity Global Change AE4H, Waterloo Science Initiative OpenAccess 2016.
7. Member of UNESCO Chair MATECSS Materials and Technologies for Energy Conversion, Saving and Storage, Dec 2015.
8. Member of NanoteG, Nanotechnology network Guatemala 2014.
9. Member of Professional school of Chemistry Engineer. June 2010.

AWARDS

1. Medal “Honor y Gloria” 2021, Oficina Nacional de la Mujer, Ministerio de Trabajo y Provisión Social, Guatemala, February 2021.
2. OWSD-Elsevier Foundation Award 2020 -Latin America. <https://owsd.net/resources/news-events/2020-owsd-elsevier-foundation-awards-announced-seattle>
3. Twas Young Research Scientist 2017 Award, Guatemala. <https://www.senacyt.gob.gt/portal/index.php/comunicacion-senacyt/noticias-senacyt/96-twas-2017>
4. Guatemaltecos ilustres 2017 scientific category, Seguros Universales. <https://guatemaltecosilustres.com/archivo/cientifica/susan-arrechea/>

HONOURS

1. Highlighted professional 2021, Asamblea de Colegio de Profesionales
2. Advisor of the Francisco Vela Award for the undergraduate thesis 2020 of Helen Escobar, Faculty of Engineering, USAC, January 2021.
<https://www.facebook.com/USACFacultadDeIngenieria/videos/4928541237188154>
3. Included in the list of 100 powerful women 2020 in Forbes Central America.
4. Included in the list of 50 defiant women from Central America 2018 (only 4 Guatemalan).
5. Recognition of the National Council of Science and Technology and National Secretariat of Science and Technology for participation in the 9th meeting of society with Guatemalan scientists working in research inside and outside the country, 2017
6. Category III researcher (highest category), researcher incentive winner, DIGI, University Registry of Researchers RUI-0067, University of San Carlos de Guatemala, RUI-0067, 2017
7. Mention Cum Laude, doctoral thesis, University of Castilla-La Mancha, Spain, 2015

OTHER ACTIVITIES

1. Participation in more than 50 conferences from 2013 to 2020 in Guatemala, Spain, Dominican Republic, Mexico, Brazil.
2. Co-organizer of more than 14 academic events in Guatemala with USAC.
3. Evaluator of research projects 4 in Guatemala and 1 in El Salvador, and 2 peer-review publications Energy Reports Elsevier
4. Advisor of 3 undergraduate students in Guatemala and 1 master student in Spain.
5. Volunteer in MOU between University San Carlos of Guatemala and University Castilla-La Mancha
6. Volunteer in National elections in Guatemala (2003, 2007, 2011)