Exponent®
Engineering & Scientific Consulting

Daniel Acevedo, Ph.D.

Senior Associate | Polymers & Chemistry
Bowie
+1-301-291-2502 | dacevedo@exponent.com

Professional Profile

Dr. Daniel Acevedo has extensive experience in process engineering for consumer electronics, specializing in sealant development, solution processing of optoelectronic materials, and display manufacturing techniques. His expertise in material characterization—including DSC, TGA, DMA, SEM, FTIR, and microscopy—guides his decision-making in material selection and formulation modification. With a deep understanding of materials science and process optimization, he is passionate about solving complex engineering challenges across the electronics, medical device, aerospace, and building materials industries.

In his research, he contributed to advancements in electronic devices, particularly solution-based crystallization methods for conjugated polymers, which led to enhanced transistor performance. He employed UV-Vis spectroscopy and high-resolution microscopy (AFM and SEM) to investigate the crystallization behavior of semiconducting polymers.

During his time at Apple, he established and optimized processes based on one-drop fill for LCD manufacturing, improving yield through targeted failure analysis and prototype builds. Collaborating with cross-functional teams, he defined equipment and material specifications to enhance lamination performance in VR displays. Additionally, he identified edge seal materials that balanced chemical resistance with mechanical durability and developed a novel validation technique for seal efficacy in next-generation displays using interferometry, chromatography and spectroscopy methods.

Looking ahead, Dr. Acevedo is eager to apply his interdisciplinary skill set toward sustainable engineering solutions—particularly in advancing circular materials, energy-efficient manufacturing processes, and eco-conscious product design. His goal is to contribute to a more sustainable and resilient future through innovative material and process development.

Academic Credentials & Professional Honors

Ph.D., Polymer Science and Engineering, University of Massachusetts, Amherst, 2017

B.S., Chemical Engineering, University of Puerto Rico, 2011

NSF, Graduate Research Fellowship Program (GRFP)

NSF, East Asia and Pacific Summer Institute (EAPSI)

Northeast Alliance for Graduate Education and Professoriate Fellowship (NEAGEP)

Tau Beta Pi Honor Society

Prior Experience

Apple Inc., 10/2017-11-2024

Panel Processing and Optics – Module (PPO-M) R&D Senior Process Engineer, 10/2023-11/2024

Panel Processing and Optics – Module (PPO-M) R&D Process Engineer, 10/2019-10/2023

Panel Processing and Optics – Optics (PPO-O) R&D Process Engineer, 10/2017-10/2019

Professional Affiliations

Tau Beta Pi

Society for Information Display

Publications

Acevedo-Cartagena, D. E.; Zhu, J.; Kocun, M.; Nonnenmann, S. S.; Hayward, R. C., Tuning Metastability of Poly(3-hexyl thiophene) Solutions to Enable in Situ Atomic Force Microscopy Imaging of Surface Nucleation, Macromolecules 2019, 52, 20, 7756–7761.

Acevedo-Cartagena, D. E.; Zhu, J.; Trabanino, E.; Pentzer, E.; Emrick, T.; Nonnenmann, S. S.; Briseño, A. L.; Hayward, R. C., Selective Nucleation of Poly(3-hexyl thiophene) Nanofibers on Multilayer Graphene Substrates, ACS Macro Lett. 2015, 4, 483–487.

Acevedo-Cartagena, D.E.; Aiyar. A.; Reichmanis, E., Effects of Dissolved Oxygen in Solvents on the Performance of Solution Processed Organic Field Effect Transistors. Proceedings of the 2010 HoP Georgia Institute of Technology Research Symposium.

Acevedo-Cartagena, D.E.; McCarthy, R.; Hillhouse, H., Effects of Humidity on the Self-Assembly of Nanostructured Thin Films. Proceedings of the 2008 Purdue SURF Research Symposium.

Presentations

Acevedo-Cartagena, D. E.; Zhu, J.; Trabanino, E.; Pentzer, E.; Emrick, T.; Nonnenmann, S. S.; Briseño, A. L.; Hayward, R. C. Selective crystallization of conjugated polymers into nanowires from graphene coated surfaces. 2016 APS March Meeting; Baltimore, MD; March 2016.

Acevedo-Cartagena, D. E.; Cho, K.; Hayward, R. C.; Controlling the orientation of poly(3-hexylthiophene) chains through solution-based crystallization. 2015 SHPE National Conference RISE Simposia; Baltimore, MD; November 2015.

Acevedo-Cartagena, D. E.; Cho, K.; Hayward, R.C.; Orientation control of poly (3-hexylthiophene) chains with graphene-coated surfaces. EAPSI Closing Ceremony; Seoul, South Korea; August 2015.

Acevedo-Cartagena, D. E.; Zhang, Y.; Trabanino, E.; Briseño, A.L.; Hayward, R.C.; Inducing Crystallization of poly(3-hexylthiophene) nanowires by well-defined nucleation sites. 2014 SACNAS National Conference; Los Angeles, CA; October 2014.

Project Experience

- Leveraged One Drop Fill (ODF) in a cell approximately 30× smaller than traditional LCDs and increased yield by an order of magnitude using a Failure Reporting, Analysis, and Corrective Action System (FRACAS) through a series of prototype builds.
- Developed specifications for high-viscosity resin requiring extreme optical refractive index homogeneity, systematically improving both performance and throughput across three equipment demos.
- Addressed slow curing kinetics that hindered resin lamination, quadrupling throughput by optimizing resin modulus to meet target specifications.
- Balanced competing priorities between chemical resistance and mechanical properties, employing design guidelines to identify polyisobutylene (PIB) as a key component in an effective edge seal and establishing a validation technique for seal efficacy through interferometry and GC-MS.
- Developed a platform for patterning semiconductors on electrodes, leveraging capillary forces for in-plane crystal orientation.
- Achieved the first in-situ demonstration of high-resolution imaging for P3HT crystallization, revealing out-of-plane crystal growth from graphene.
- Enabled rapid fabrication of transistors through selective crystallization, enhancing transistor mobility compared to spin-coated counterparts.