

# Taylor Bryan Harvey, Ph.D.

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Associate Professor of Engineering

Regional Director for Central Texas - Texas A&M Engineering Experiment Station (TEES)

Texas A&M University - Central Texas

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## Education

**Ph.D. Chemical Engineering**, Sept 2010 – Dec 2014

University of Texas at Austin, Austin, TX

Advisor: Dr. Brian Korgel

Dissertation: Sintering of Cu(In,Ga)Se<sub>2</sub> Nanocrystal Films for Photovoltaics

**B.S. Chemical Engineering**, Magna Cum Laude, April 2006

Brigham Young University, Provo, UT

- James J. Christensen Outstanding Chemical Engineering Senior 2006

Minor: History

## Work Experience

**Associate Professor of Engineering**, May 2021 - Current

**Chancellor's Assistant Professor of Research**, Sep 2016 – May 2021

Texas A&M - Central Texas, Killeen Texas

- **Lead Faculty and Coordinator, Mechanical Engineering Technology**
- **Texas Engineering Experimental Station (TEES), Regional Director, Central Texas**
- **Director of Research Park Support (2022-current)**
- 2020 Texas A&M Central Outstanding Faculty Quantitative Scholarship Award winner
- Co-Director - Texas A&M Site, NSF I/UCRC on Next Generation Photovoltaics (2017-2020)
- Raised \$6.5M of research funding (See Grants/Contracts)
- Established the Solar Characterization Lab
- Lead solar, semiconductor, and cybersecurity research
- Designed and implemented Mechanical Engineering Technology Degree
- Teach engineering and chemistry courses (24 total sections, See Teaching)
- Supervise postdocs, graduate, and undergraduate students

**Co-Founder and CEO/CTO**, Lucelo Technologies, Austin Texas

May 2016 – Feb 2017 (CEO), Mar 2014 – May 2016 (CTO)

- Lead development of lightweight, flexible, low-cost solar cells
- NSF Phase 1 SBIR Principle Investigator
- Raised Capital (>\$400k) and develop business plan
- Supervised a team of 4 employees

**Reservoir Engineer**, Delta Petroleum Company, Denver, Colorado

Aug 2008 – Sept 2010

- Determined economic value of asset and established reserves using simulation (TEMPEST), analytical tools and principles (IPM), or analog data
- Assess commerciality of exploration and acquisition targets with a variety of engineering tools and economic modeling with ARIES

**Reservoir Engineer**, ExxonMobil Development Company, Houston, Texas

May 2006 – Aug 2008

- Optimize field development plan for additional sour gas injection by history matching (20+ years) and predicting future performance with a dual porosity, dual permeability compositional ECLIPSE simulation model
- Developed depletion plans (production profiles, well layouts) for exploration prospects using simulation (Empower), analytical tools and principles (IPM), or analog data

**Process Engineering Intern**, Celanese Chemical Company, Bay City, Texas

May 2005 - August 2005

- Researched efficiency and sizing of a new catalyst separation equipment
- Evaluated swap of distillation towers using Aspen Plus

## Publications

- Roberts, M.; **Harvey, T.**; Sullivan, J.; Torabi, A.; “Analyze and visualize cathodoluminescence data obtained from images of a photovoltaic cell using the R language,” *Journal of Education and Social Development* (2020), 4 (1), 18-24.
- Jones, C.; Bracewell, T.; Torabi, A.; Beck, C.C.; **Harvey, T.B.**, “The Effect of Hydrochloric Acid (HCl) on Permanent Molars: A Scanning Electron Microscope (SEM) and Energy Dispersive X-ray Spectroscopy (EDS) Study,” *Medicine, Science and the Law* (2020), 30 (6), 172-181.
- Siegler, T.D; Zhang Y.; Dolocan, A.; Reimnitz, L.C.; Torabi, A.; Abney, M. K.; Choi, J.; Cossio, G.; Houck, D.W.; Yu, E.T.; Li, X.; **Harvey, T.B.**; Milliron, D.J.; Korgel, B.A., “Addition of Monovalent Silver Cations to  $\text{CH}_3\text{NH}_3\text{PbBr}_3$  Produces Crystallographically Oriented Perovskite Thin Films,” *ACS Appl. Energy Mater.* (2019), 2 (8), 6087-6096.
- Harvey, T. B.**; Bonafe, F.; Updegrave, T.; Reddy, V.; Thomas, C.; Kamarajugadda, S.; Stolle, C. J.; Pernik, D. R.; Du, J.; Korgel, B. A., “Uniform Selenization of Crack-Free Films of  $\text{Cu}(\text{In,Ga})\text{Se}_2$  Nanocrystals.” *ACS Appl. Energy Mater.* (2019), 2 (1), 736-742.
- Voggu, V. R.; Sham, J.; Pfeffer, S.; Pate, J.; Phillip, L.; **Harvey, T. B.**; Brown, R.M.; Korgel, B.A., “Flexible  $\text{CuInSe}_2$  Nanocrystal Solar Cells on Paper.” *ACS Energy Letters* (2017), 2 (3), 574-581.
- Stolle, C. J.; **Harvey, T. B.**; Korgel, B. A., “Photonic Curing of Ligand-Capped  $\text{CuInSe}_2$  Nanocrystal Films.” *40th IEEE Photovoltaic Specialist Conference (PVSC)* (2014), 0270-0274.
- Stolle, C.J.; **Harvey, T.B.**; Pernik, D.R.; Hibbert, J. I.; Du, J.; Rhee, D.J.; Akhavan, V.A.; Schaller, R.D.; Korgel, B.A., “Multiexciton Solar Cells of  $\text{CuInSe}_2$  Nanocrystals” *J. Phys. Chem. Lett.* (2014), 5, 304-309.
- Harvey, T.B.**; Mori, I.; Stolle, C.J.; Bogart, T.; Ostrowski, D.P.; Glaz, M.S.; Du, J.; Pernik, D.; Akhavan, V. A; Vanden Bout, D.A.; Korgel, B.A., “Multistep Selenization of Copper Indium Gallium Selenide (CIGS) Nanocrystal Photovoltaics” *ACS Appl. Mater. Interfaces* (2013), 5, 9134-9140.
- Panthani, M.G.; Stolle, C.J.; Reid, D.K.; Rhee, D.J.; **Harvey, T.B.**; Akhavan, V.A.; Yu, Y.; Korgel, B.A., “ $\text{CuInSe}_2$  Quantum Dot Solar Cells with High Open-Circuit Voltage” *J. Phys. Chem. Lett.* (2013), 4 (12), 2030-2034.
- Stolle, C. J.; **Harvey, T.B.**; Korgel, B.A., “Nanocrystal Photovoltaics: A Review of Recent Progress” *Current Opinion in Chemical Engineering* (2013), 2 (2), 160-167.
- Akhavan, V. A; **Harvey, T.B.**; Stolle, C.J.; Ostrowski, D.P.; Glaz, M.S.; Goodfellow, B.W.; Panthani, M.G.; Reid, D.K.; Vanden Bout, D.A.; Korgel, B.A., “Influence of

Composition on the Performance of Sintered Cu(In,Ga)Se<sub>2</sub> (CIGS) Nanocrystal Thin Film Photovoltaic Devices” *ChemSusChem* 6 (2013) 481-486.

Steinhagen, C.; **Harvey, T.B.**; Stolle, C. J.; Harris, J.; Korgel, B.A., “Pyrite Nanocrystal Solar Cells: Promising or Fool's Gold?” *Journal of Physical Chemistry Letters* (2012), 3, 2352-2356.

Stolle, C. J.; Panthani, Matthew G.; **Harvey, T.B.**; Akhavan, V.A.; Korgel, B.A., “Comparison of the Photovoltaic Response of Oleylamine and Inorganic Ligand-Capped CuInSe<sub>2</sub> Nanocrystals” *ACS Appl. Mater. Interfaces* (2012), 4(5), 2757-2761.

Akhavan, V.A.; Goodfellow, B.W.; Panthani, M.G.; Steinhagen, C.; **Harvey, T.B.**; Stolle, C. J.; Korgel, B.A., “Colloidal CIGS and CZTS Nanocrystals: A Precursor Route to Printed Photovoltaics” *Journal of Solid State Chemistry* (2012), 189, 2-12.

## Presentations

Torabi, A.; Beck, C.C.; Munshi, A.; Shimpi, T.; Reich, C.; Sampath, W.S.; **Harvey, T.B.**, “Scanning Electron Microscopy Measurements of the Luminescent and Electrical Properties of Thin Film Photovoltaic Devices” *AICHE Annual Meeting* (2019), Orlando, FL.

**Harvey, T. B.**, “New Solar Technologies: From Concept to Commercialization” *IUCRC Master Series Lectures* (2018) Austin, TX. (Invited Seminar Speaker)

**Harvey, T. B.**, “Solar Innovation in Central Texas” *Solar Austin* (2018) Austin, TX. (Invited Seminar Speaker)

**Harvey, T. B.**; Reddy, V.; Phillips, L.; Simonsen, B.; Korgel, B.A.; Morehead, S.; Chockla, A.; “Flexible CIGS Nanocrystal devices” *AICHE Annual Meeting* (2017), Minneapolis, MN.

**Harvey, T. B.**, “Cover it all with Solar: An Energy Entrepreneurship Story” *Graduate Engineering Council Seminar* (2016) Austin, TX. (Invited Seminar Speaker)

**Harvey, T. B.**; Bonafé, F.; Updegrave, T.; Reddy, V.; Thomas, C.; Kamarajugadda, S.C.; Stolle, C.J.; Pernik, D.; Du, J.; Korgel, B.A., “Photovoltaics from Automated, Ultra-Sonic Spray-Deposited Cu(In,Ga)Se<sub>2</sub> Nanocrystal Films” *AICHE Annual Meeting* (2014) Atlanta, GA.

**Harvey, T.B.**, “Photovoltaics - Current Status and Future Directions” *Energy Security Course for Indonesia Defense University* (2014) Monterey, CA. (Invited Lecture)

**Harvey, T.B.**; Stolle, C.J.; Bogart, T.; Du, J.; Pernik, D.; Akhavan, V. A; Korgel, B. A., “Multistep Selenization of Copper Indium Gallium Selenide (CIGS) Nanocrystal Photovoltaics,” *AICHE Annual Meeting* (2013) San Francisco, CA.

**Harvey, T.B.**; Mori, I.; Stolle, C.J.; Bogart, T.; Ostrowski, D.P.; Glaz, M.S.; Du, J.; Pernik, D.; Akhavan, V. A; Vanden Bout, D.A.; Korgel, B.A., “Multistep Selenization of Copper Indium Gallium Selenide (CIGS) Nanocrystal Photovoltaics” *MRS ICMAT* (2013) June 30 to July 5, Suntec, Singapore.

## Teaching

**Lead Faculty and Coordinator**, Texas A&M University - Central Texas, Killeen Texas  
Mechanical Engineering Technology B.S. Program

Thermodynamics – 2019 Fall, 2021 Fall, 2022 Fall

Engineering Ethics – 2019 Fall, 2020 Fall, 2021 Fall, 2022 Fall

Materials Science – 2020 Spring, 2021 Spring, 2022 Spring

Thermal Fluids Lab – 2020 Spring

Senior Design A – 2020 Fall, 2021 Fall, 2022 Fall

Senior Design B – 2021 Spring, 2022 Spring

Engineering Economics – 2020 Fall, 2021 Fall, 2022 Fall

**Adjunct Faculty**, Central Texas College, Killeen Texas  
Introduction to Engineering – 2017 Spring, 2017 Fall, 2018 Spring, 2018 Fall, 2019 Spring  
Chemistry II – 2017 Summer, 2019 Spring  
Chemistry I – 2017 Spring, 2017 Fall, 2018 Spring, 2018 Fall (two sections), 2019 Spring  
Introduction to Chemistry – 2016 Fall (two sections)

**Patents**

Photonic Curing of Nanocrystal Films for Photovoltaics, US Patent 10,593,821  
Bacterial Cellulose Paper-Based Flexible Electronics Employing Nanocrystals, US Patent App. US20210028324A1

**Grants/  
Contracts**

“Hardware Integrity Verification Utilizing Scanning Electron Microscopy,” Air Force Research Laboratory/Department of Homeland Security, co-PI, \$4.2M

Chancellor’s Research Initiative, Texas A&M University System, PI, \$1.54M

National Science Foundation Industry/University Collaborative Research Center (I/UCRC) on Next Generation Photovoltaics, co-PI, \$400k  
(an additional \$525k in funding from external partners)

**Committees  
and  
Organizations**

University Council (2019 – Current)

Undergraduate Council (2020 – 2022)

Faculty Scholarship and Research Committee (FSRC) – executive committee member  
(2016 – Current)

University Economic Development Council (UEDC) – (2016 – Current)

Central Texas University Research Park - University Oversight – (2018 – Current)

**Education  
Outreach**

Harvey, T. B., “Engineering” *CTC Early College High School* (2/2020) Killeen, TX

Harvey, T. B., “Engineering” *Ellison High School Science Students at CTC* (11/2019) Killeen, TX

Harvey, T. B., “Solar Energy” *CTC Elementary Outreach Day* (8/2019) Killeen, TX

Harvey, T. B., “Engineering” *Ellison High School Science Students* (4/2019) Killeen, TX

Harvey, T. B., “Choose Your Own Solar Adventure” and Scanning Electron Microscope Experience. *Harker Height High School Science Students Field Trip to TAMUCT* (12/2018) Killeen, TX

Harvey, T. B., “Choose Your Own Solar Adventure” *Lampasas High School Science Students* (11/2018) Lampasas, TX

Harvey, T. B., “Choose Your Own Solar Adventure” *Harker Height High School Science Students* (4/2018) Harker Heights, TX

Harvey, T. B., “Choose Your Own Solar Adventure” *Harker Height High School Science Students* (2/2018) Harker Heights, TX

Harvey, T. B., “Choose Your Own Solar Adventure” *Boy Scouts Troop 243* (1/2018) Killeen, TX

Harvey, T. B., “How Does Solar Energy Work?” *West Ward Elementary School* (10/2017) Killeen, TX

Harvey, T. B., “Choose Your Own Solar Adventure” *Lampasas High School* (9/2017) Lampasas, TX

Harvey, T. B., "Solar Energy and Entrepreneurship" Austin School for the Deaf (6/2017)  
Austin, TX

Harvey, T. B., "Choose Your Own Solar Adventure" Copperas Cove *High School*  
(12/2016) Copperas Cove, TX

Harvey, T. B., "Choose Your Own Solar Adventure" *Lampasas High School* (10/2016)  
Lampasas, TX

Harvey, T. B., "Where Does Your Power Come From" *Boys and Girls Club of Central  
Texas* (10/2016) Killeen, TX

**Community  
Service**

Harvey, T. B., "Solar Energy: Current Status and New Technologies" *Ultrusa* (3/2019)  
Killeen, TX

Harvey, T. B., "New Solar Technologies: From Concept to Commercialization" *UT-  
Austin Chemical Engineering Alumni* (6/2018) Austin, TX

Harvey, T. B., "Solar Energy: Current Status and New Technologies" *Harker Heights  
Kiwanis Club* (8/2017) Harker Heights, TX

Harvey, T. B., "Solar Energy: Current Status and New Technologies" *Killeen Noon Lions  
Club* (5/2017) Killeen, TX

Harvey, T. B., "Solar Energy: Current Status and New Technologies" *Greater Killeen  
Young Professionals* (4/2017) Killeen, TX

Harvey, T. B., "Solar Energy: Current Status and New Technologies" *Killeen Heights  
Rotary Club* (3/2017) Killeen, TX

Harvey, T. B., "Solar Energy Research at TAMUCT" *Harker Heights Leadership Council*  
(9/2016) Killeen, TX