

# Stanford

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## William Abraham Tarpeh

Assistant Professor of Chemical Engineering, by courtesy, of Civil and Environmental Engineering and Center Fellow, by courtesy, at the Woods Institute for the Environment

📄 Curriculum Vitae available Online

### Bio

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#### BIO

Reimagining liquid waste streams as resources can lead to recovery of valuable products and more efficient, less costly approaches to reducing harmful discharges to the environment. Pollutants in effluent streams can be captured and used as valuable inputs to other processes. For example, municipal wastewater contains resources like energy, water, nutrients, and metals. The Tarpeh Lab develops and evaluates novel approaches to resource recovery from “waste” waters at several synergistic scales: molecular mechanisms of chemical transport and transformation; novel unit processes that increase resource efficiency; and systems-level assessments that identify optimization opportunities. We employ understanding of electrochemistry, separations, thermodynamics, kinetics, and reactor design to preferentially recover resources from waste. We leverage these molecular-scale insights to increase the sustainability of engineered processes in terms of energy, environmental impact, and cost.

#### ACADEMIC APPOINTMENTS

- Assistant Professor, Chemical Engineering
- Assistant Professor (By courtesy), Civil and Environmental Engineering
- Center Fellow (By courtesy), Stanford Woods Institute for the Environment
- Member, Bio-X

#### PROFESSIONAL EDUCATION

- PhD, University of California, Berkeley , Environmental Engineering (2017)
- MS, University of California, Berkeley , Environmental Engineering (2013)
- BS, Stanford University , Chemical Engineering (2012)

#### LINKS

- Research Group Website: <http://tarpehgroup.stanford.edu>
- Tarpeh Research Group: <https://cheme.stanford.edu/people/william-tarpeh>

### Teaching

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#### COURSES

##### 2019-20

- Chemical Engineering Plant Design: CHEMENG 180 (Spr)
- Graduate Practical Training: CHEMENG 299 (Sum)
- Introduction to Chemical Engineering: CHEMENG 20, ENGR 20 (Win)

- Special Topics in Electrochemistry and Water Treatment: CHEMENG 524 (Aut, Win, Spr, Sum)

#### 2018-19

- Introduction to Chemical Engineering: CHEMENG 20, ENGR 20 (Spr)
- Special Topics in Electrochemistry and Water Treatment: CHEMENG 524 (Spr)

### STANFORD ADVISEES

#### Doctoral Dissertation Reader (AC)

Micha Ben-Naim, McKenzie Hubert, James Raiford, Joel Sanchez, Joel Schneider, Camila de Paula Teixeira

#### Orals Chair

Michael Kim

#### Postdoctoral Faculty Sponsor

Hang Dong, Linchao Mu

#### Doctoral Dissertation Advisor (AC)

Brandon Clark, Jinyu Guo, Matthew Liu, Valerie Niemann, Anita Shao

#### Doctoral Dissertation Co-Advisor (AC)

Emily Penn

#### Postdoctoral Research Mentor

Hang Dong, Linchao Mu

#### Doctoral (Program)

Anna Kogler, Lorelay Mendoza

## Publications

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### PUBLICATIONS

- **Electro-assisted regeneration of pH-sensitive ion exchangers for sustainable phosphate removal and recovery.** *Water research*  
Dong, H., Wei, L., Tarpeh, W. A.  
2020; 184: 116167
- **Selective recovery of ammonia nitrogen from wastewaters with transition metal-loaded polymeric cation exchange adsorbents.** *Chemistry (Weinheim an der Bergstrasse, Germany)*  
Clark, B., Tarpeh, W.  
2020
- **Novel two-chamber tubular microbial desalination cell for bioelectricity production, wastewater treatment and desalination with a focus on self-generated pH control** *Desalination*  
Jafary, T., Al-Mamun, A., Alhimali, H., Baawain, M., Rahman, S., Tarpeh, W. A., Dhar, B., Kim, B.  
2020; 481
- **Validation and mechanism of a low-cost graphite carbon electrode for electrochemical brine valorization** *ACS Sustainable Chemistry & Engineering*  
Mu, L., Wang, Y., Tarpeh, W. A.  
2020; 8 (23): 8648-8654
- **Process design tools and techno-economic analysis for capacitive deionization.** *Water research*  
Hasseler, T. D., Ramachandran, A., Tarpeh, W. A., Stadermann, M., Santiago, J. G.  
2020; 183: 116034
- **Building an operational framework for selective nitrogen recovery via electrochemical stripping.** *Water research*  
Liu, M. J., Neo, B. S., Tarpeh, W. A.

2019; 169: 115226

- **Selective Hydrogenation of Furfural in a Proton Exchange Membrane Reactor Using Hybrid Pd/Pd Black on Alumina** *CHEMELECTROCHEM*  
Carl, S., Waldrop, K., Pintauro, P., Thompson, L. T., Tarpeh, W. A.  
2019
- **Sanitation for Low-Income Regions: A Cross-Disciplinary Review.** *Annual review of environment and resources*  
Hyun, C., Burt, Z., Crider, Y., Nelson, K. L., Sharada Prasad, C. S., Rayasam, S. D., Tarpeh, W., Ray, I.  
2019; 44 (1): 287–318
- **Quantitative Evaluation of an Integrated System for Valorization of Wastewater Algae as Bio-oil, Fuel Gas, and Fertilizer Products** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Li, Y., Tarpeh, W. A., Nelson, K. L., Strathmann, T. J.  
2018; 52 (21): 12717–27
- **Effects of operating and design parameters on ion exchange columns for nutrient recovery from urine** *ENVIRONMENTAL SCIENCE-WATER RESEARCH & TECHNOLOGY*  
Tarpeh, W. A., Wald, I., Wiprachtiger, M., Nelson, K. L.  
2018; 4 (6): 828–38
- **Electrochemical Stripping to Recover Nitrogen from Source-Separated Urine** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Tarpeh, W. A., Barazesh, J. M., Cath, T. Y., Nelson, K. L.  
2018; 52 (3): 1453–60
- **Evaluating ion exchange for nitrogen recovery from source-separated urine in Nairobi, Kenya** *Development Engineering*  
Tarpeh, W. A., Wald, I., Omollo, M. O., Egan, T., Nelson, K. L.  
2018; 3: 188-195
- **Life-Cycle Cost and Environmental Assessment of Decentralized Nitrogen Recovery Using Ion Exchange from Source-Separated Urine through Spatial Modeling** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Kavvada, O., Tarpeh, W. A., Horvath, A., Nelson, K. L.  
2017; 51 (21): 12061–71
- **The sanitation and urban agriculture nexus: urine collection and application as fertilizer in Sao Paulo, Brazil** *JOURNAL OF WATER SANITATION AND HYGIENE FOR DEVELOPMENT*  
Chripim, M. C., Tarpeh, W. A., Salinas, D. P., Nolasco, M. A.  
2017; 7 (3): 455–65
- **Comparing Ion Exchange Adsorbents for Nitrogen Recovery from Source-Separated Urine** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Tarpeh, W. A., Udert, K. M., Nelson, K. L.  
2017; 51 (4): 2373–81