

## Ram Kumar, Ph.D.

Postdoctoral Research Fellow, Energy Geosciences Division  
Lawrence Berkeley National Laboratory, Berkeley, USA

Email: ramkumar@lbl.gov

Cell: +1(813)570-0512

<https://www.researchgate.net/profile/Ram-Kumar-6>

<https://www.linkedin.com/in/ram-kr>

## Education

---

- **Ph.D. (Chemical Engineering) University of South Florida (USF), Tampa, FL Aug 2014-Dec 2019**  
Doctoral Dissertation title “Effects of Reservoir Conditions and Trace Co-contaminant Gases on Geological Carbon Sequestration”, awarded Outstanding PhD Dissertation by the Department of Chemical & Biomedical Engineering at the University of South Florida, Tampa.
- **B.Tech. (Chemical Technology) Institute of Chemical Technology, Mumbai, India July 2007-Jun 2011**
- **IBM Data Science Professional Certificate September 2020**

## Technical Skills

---

### Software/Programming Languages

- TOUGHREACT 3.3, TOUGH 2, MODFLOW 6, Visual MODFLOW, The Geochemist’s Workbench, CONTAM 3.3, Energy Plus 8.7, PHREEQC, MATLAB, C++, Python, COMSOL, Fluent, MS Visual Studio.

### Instruments/Experimental Skills

- Atomic Absorption Spectroscopy, ICP-AES, SEM, X-ray diffraction, HPLC, GC, FTIR, UV-VIS, Thermal Gravimetric Analysis/Differential Thermal Analysis, Contact Angle Analysis, Surface Area and Pore Size Analysis.

## Projects/Professional Experiences

---

### Postdoctoral Research Fellow Lawrence Berkeley National Lab, Berkeley, CA Nov 2020 – Present

- **Project:** Modeling of Thermo-Hydro-Mechanical-Chemical processes in Aquifer Thermal Energy Storage system.

### Groundwater Modeling Engineer Tedesco’s Environment Inc, Tampa, FL March 2020 – Oct 2020

- **Project:** Modeling of groundwater system to mitigate/minimize the contaminant transport from nearby containment sites. A project from **Florida Power & Light** to get the dewatering permit from the Miami-Dade County Department of Regulatory and Economic Resources. The permit was granted based on the model.

**Key responsibilities:** Modeling of the dewatering system to reduce contaminant transport, optimization of wellbore system, troubleshooting/debugging Visual MODFLOW with the developers.

### Research Assistant University of South Florida, Tampa, FL Jan 2015 – Dec 2019

- **Project:** Assessment of Geological Carbon Sequestration in South Florida Basin. The project includes development of reactive transport modeling tool (TOUGH2CPI) for the simulation of multiphase systems, in collaboration with the United States Geological Survey (USGS) and Aqueous Solutions LLC, IL, USA.

**Key responsibilities:** Reservoir simulation involving modeling of fluid flow, solute transport, reaction kinetics, and phase equilibrium in multiphase multicomponent systems. Coupling of flow simulator TOUGH2 and Geochemist’s Workbench to enable reactive transport modeling of geological CO<sub>2</sub> sequestration.

### Research Assistant MoleKule Inc, Tampa, FL May 2017 – Dec 2017

- Recognized by the **Florida High Tech Corridor Council** for excellence in student research on the **project titled** “Analysis of the Performance of Molekule Photo-electrochemical Technology for Effectiveness”.

**Responsibilities:** Optimization of Molekule devices for improved air purification efficiency. Responsible for Computational Fluid Dynamics (CFD) simulations and analysis of experimental/modeling data for improved efficiency of the device. Modeling of Indoor Air Quality (IAQ) and degradation of volatile organic compounds.

## Teaching Experience

**Teaching Associate**      **University of South Florida, Tampa, FL**      **Aug 2014 – Dec 2019**

- Chemical Engineering Computations – assisting in-class students with solving chemical engineering problems using MATLAB; debugging MATLAB codes in the class; grading assignments and tests.
- Chemical Engineering Laboratory I & II – setting up experiments involving diffusion, VLE, mixing, batch reactors, CSTR, packed column, heat exchanger, and process control; assisted in data analysis and grading lab reports.
- Chemical Engineering Thermodynamics – assisting student during the office hours, grading.

## Awards

- Outstanding PhD Dissertation Award, Department of Chemical & Biomedical Engineering, USF, 2020
- Dissertation Completion Fellowship for doctoral research, University of South Florida, 2019
- Outstanding Research Progress Award, University of South Florida, 2019
- Outstanding Conference Contribution Award, University of South Florida, 2019
- Best Oral Presentation of Geology and Geosciences session at International Conference of Environmental Science and Development, Milan, Italy, 2019
- Travel Award for International Conference Presentation, University of South Florida, 2017 & 2019
- TOUGH Symposium Student Fellow Award, Lawrence Berkley National Laboratory, 2018
- AIChE International Travel Grant to present research at the World Congress of Chemical Engineering, Barcelona, Spain, 2017
- Excellence in Student Research Award by Florida High Tech Corridor Council, 2017
- Young Innovators Award, United Phosphorous Ltd and Institute of Chemical Technology, Mumbai, 2011.
- Best Oral Presentation, Indian Institute of Chemical Engineers, 2010

## Research Papers/Selected Proceedings/Presentations

### Peer Reviewed Papers

**R. Kumar**, S. W. Campbell, E. L. Sonnenthal, J. A. Cunningham. “Effect of salinity on the geological sequestration of CO<sub>2</sub> in a layered carbonate formation.” Published in “GHG: Science & Technology”.  
<https://doi.org/10.1002/ghg.1960>

**R. Kumar**, S. W. Campbell, J. A. Cunningham. “Effect of temperature on the geological sequestration of CO<sub>2</sub> in a layered carbonate formation.” Published in “ASME Journal of Energy Resources Technology”.  
<https://doi.org/10.1115/1.4046137>

Roberts-Ashby T, Berger PM, Cunningham JA, **Kumar R**, Blondes M. In press. Modeling geologic sequestration of CO<sub>2</sub> in a deep saline carbonate reservoir with T2CPI, a new tool for reactive transport modeling. Published in “Environmental Geosciences” (AAPG/DEG), <https://doi.org/10.1306/eg.08061919003>

### Paper under review/preparation

**R. Kumar**, S. W. Campbell, E. L. Sonnenthal, J. A. Cunningham. “Effect of Co-injecting SO<sub>2</sub> Impurity and Reservoir Heterogeneity on Geological Carbon Sequestration”. Paper under review in “**Applied Energy**”.

**R. Kumar**, S. W. Campbell, E. L. Sonnenthal, J. A. Cunningham. “Simulation of SO<sub>2</sub> – NO<sub>2</sub> – CO<sub>2</sub> co-injection in a layered carbonate formation: optimization of impurities in geological carbon storage”. Paper under preparation for submission in “**International Journal of Greenhouse Gas Control**”.

### Conference papers/proceedings

- R. Kumar**, S. W. Campbell, J. A. Cunningham. “Impact of CO<sub>2</sub>-NO<sub>2</sub> co-injection on geological carbon storage” **Carbon Management Technology Conference 2019** (July 15 - July 18, 2019), Houston, Texas, USA.
- R. Kumar**, S. W. Campbell, J. A. Cunningham. “Effect of temperature on the geological sequestration of CO<sub>2</sub> in a layered carbonate formation.” **International Conference on Environmental Science and Development 2019** (Feb 13 - Feb 15, 2019), Milan, Italy.
- R. Kumar**, S. W. Campbell, J. A. Cunningham. “Assessment of Geological Carbon Storage in a Heterogeneous Carbonate Formation.” Presented at the **Proceedings of the 10th International Conference on Combustion, Incineration/Pyrolysis, Emission and Climate Change** (December 18-21, 2018), Bangkok, Thailand.
- R. Kumar**, S. W. Campbell, J. A. Cunningham. “Effect of salinity on the geological sequestration of CO<sub>2</sub> in a layered carbonate formation.” **TOUGH Symposium 2018** (October 8 - October 10, 2018), Berkley, USA.
- R. Kumar**, T. Roberts-Ashby, P. Berger, M. Blondes, J. Cunningham. “New method for numerical modeling of CO<sub>2</sub> sequestration in Dollar Bay Formation, Florida, USA.” **43<sup>rd</sup> International Technical Conference on Clean Energy** (June 3 - June 8, 2018), Clearwater, Florida, USA.
- R. Kumar**, S. W. Campbell, J. Cunningham “Numerical modeling of multiphase isothermal fluid flow and reactive geochemical transport for CO<sub>2</sub> sequestration in Dollar Bay aquifer” **Proceedings of the 10th World Congress of Chemical Engineering** (October 1-5, 2017), Barcelona, Spain.
- R. Kumar**, S. W. Campbell, J. Cunningham “Numerical Modeling of CO<sub>2</sub> Sequestration in Deep, Saline, dolomitic-limestone aquifers” **Proceedings of the 2016 AIChE annual meeting** (Nov 13-18, 2016), San Francisco, CA, ISBN:978-0-8169-1097-7.
- R. Kumar**, P. Bharude, R. Ramakrishnan. “Designing the manufacturing process of Glacial Acetic Acid from 20% acetic acid and water solution via minimum steam consumption route”. Presented at **Young Innovators Choice Competition 2011** (January 9 - January 14, 2011), Mumbai, India. Led the team to solve the Industrial Problem given by **United Phosphorus Ltd., India**.
- R. Kumar**, R. Muralidharan, R. Ramakrishnan. “Recycling of polypropylene waste”, presented at **Chemergence 2010** (October 1 - October 3, 2010), Mumbai, India. Organized by the Indian Institute of Chemical Engineers and Thadomal Shahani Engineering College, India.

### Peer Reviews

---

- Greenhouse Gases: Science and Technology
- Oil & Gas Science and Technology
- International Journal of Mathematical, Engineering, and Management Sciences

### Professional Memberships

---

- Society of Petroleum Engineers
- American Institute of Chemical Engineers
- American Water Works Association