

# Chang (Carson) Da

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## EDUCATIONS:

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**University of Texas at Austin**, Austin TX July 2015 to present  
Major: Chemical Engineering, **PhD candidate**  
Cumulative GPA: 3.67  
Estimated graduation date: May 2020

**Rice University**, Houston TX August 2011 to May 2015  
Major: Chemical Engineering, **Bachelor of Science**  
Minor: Computational and Applied Mathematics  
Major GPA: 3.71 (**Rice University President Honor Roll**)

*Experimental skills:* phase behavior, Dynamic Light Scattering (DLS), **surface-modification of NPs, core flood tests, interfacial tension measurement (IFT)**, contact angle, foam stability tests, Thermogravimetric Analysis (TGA), Nuclear Magnetic Resonance (NMR), **shear rheology**, confocal microscopy, **liquid chromatography mass spectrometry (LC/MS)**, powder X-ray diffractions (XRD)

*Coding skills:* **MATLAB**, Fortran, R

## EXPERIENCE:

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**Optimization of Nano-Surfactant and Polymer Formulations with Low Retention on Carbonates**  
**Aramco Research Center - Boston** June 2019 to August 2019  
*Summer Intern*

- Design co-surfactants and polymers to optimize solubility of petroleum sulfonates in brine and reduce retentions
- Conduct core flood tests to measure dynamic retentions of surfactant/polymer formulations on carbonate rocks

**Synthesis and Surface-Modifications of Nanoparticles for High Temp. and High Salinity Conditions**  
University of Texas at Austin October 2017 to Present  
*Supervised by Dr. Keith Johnston (Sponsored by TOTAL S.A.)*

- Conduct surface-modifications on silica NPs through silanol reactions to achieve colloidal stability in brines
- Study the synergic effects between NPs and surfactants on improving N<sub>2</sub>/water foam stability
- Measure contact angles to study wettability alternation effect of nano-fluids on calcite surface in presence of crude oils

**CO<sub>2</sub> Mobility Control with Stable Foams at High Temperature in High Salinity Brine**  
University of Texas at Austin January 2016 to June 2018  
*Supervised by Dr. Keith Johnston and Dr. George J. Hirasaki (Sponsored by Abu Dhabi National Oil Co.)*

- Design surfactant formulations to stabilize CO<sub>2</sub>/water foams at high temp. and high salinity reservoir conditions
- Study long-term chemical stability at elevated temperatures with LC/MS
- Conclude that CO<sub>2</sub> foam injection could improve oil recovery and benefit CO<sub>2</sub> sequestrations

**Ultra Dry CO<sub>2</sub>/Water Foams Stabilized with Viscoelastic Surfactants for Hydraulic Fracturing**  
University of Texas at Austin July 2015 to June 2016  
*Supervised by Dr. Keith Johnston, Dr. Chun Huh and Dr. Masa Prodanovic (Sponsored by DOE)*

- Propose ultra-dry CO<sub>2</sub>/water foams as fracture fluids to carry proppants and reduce water usage
- Design surfactant formulations to form viscoelastic aqueous phase and viscous foams with entangled wormlike micelles
- Evaluate the ability of viscoelastic foams to suspend and carry proppants in sapphire cells

## Design of Surfactant Formulations for Enhanced Oil Recovery (EOR) in Carbonate Reservoirs

Rice University

May 2012 to May 2015

*Supervised by Dr. George J. Hirasaki*

- Screen and optimize for surfactant formulations with low IFT and low adsorption on carbonate reservoirs
- Measure static adsorptions of both surfactants on carbonate minerals through potentiometric titration
- Used Powder X-ray Diffraction (XRD) to examine the physico-chemical makeups of natural carbonates

## **AWARDS & ACTIVITIES:**

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### Teaching Assistant Awards (Favorite TA in the Department)

<i>Teaching Assistant</i> , Chemical Engineering Fundamentals (CHBE 301, Rice University)	Fall 2013
<i>Teaching Assistant</i> , Transport Phenomena I (CHBE 401, Rice University)	Fall 2014
<i>Teaching Assistant</i> , Chemical Engineering Process and Project Lab (CHE 264, UT Austin)	Spring 2017

### Safety Representative for Johnston Lab

2016 to present

- Supervise lab safety issues and take charge of safety managements for all lab users
- Collaborate with EHS stuffs on routinely lab safety inspections

### Society of Petroleum Engineering (SPE)

2012 to present

- Present latest research highlights in technical sessions of major SPE conferences, including Improved Oil Recovery (IOR) and Annual Technical Conference & Exhibition (ATCE)

## **PUBLICATIONS & CONFERENCES:**

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- **Da, C.**, Alzobaidi, S., Jian, G., Zhang, L., Biswal, S. L., Hirasaki, G. J., & Johnston, K. P. (2018). Carbon dioxide/water foams stabilized with a zwitterionic surfactant at temperatures up to 150° C in high salinity brine. *Journal of Petroleum Science and Engineering*, 166, 880-890.
- **Da, C.**, Jian, G., Alzobaidi, S., Zhang, X., Yang, J., Biswal, S. L., Hirasaki, G. J., & Johnston, K. P. (2018) Design of CO<sub>2</sub>-in-water foam stabilized with switchable amine surfactants at high temperature in high salinity brine and effect of oil. *Energy & Fuels*, 32 (12), 12259-12267
- Elhag, A.S., **Da, C.**, Chen, Y., Mukherjee, N., Noguera, J.A., Alzobaidi, S., Reddy, P.P., AlSumaiti, A.M., Hirasaki, G.J., Biswal, S.L. and Nguyen, Q.P. (2018). Viscoelastic diamine surfactant for stable carbon dioxide/water foams over a wide range in salinity and temperature. *Journal of colloid and interface science*, 522, 151-162.
- Alzobaidi, S., **Da, C.**, Tran, V., Prodanović, M., & Johnston, K. P. (2017). High temperature ultralow water content carbon dioxide-in-water foam stabilized with viscoelastic zwitterionic surfactants. *Journal of colloid and interface science*, 488, 79-91.
- Xue, Z., Worthen, A.J., **Da, C.**, Qajar, A., Ketchum, I.R., Alzobaidi, S., Huh, C., Prodanović, M. and Johnston, K.P. (2015). Ultradry carbon dioxide-in-water foams with viscoelastic aqueous phases. *Langmuir*, 32(1), 28-37.
- Ma, K., Cui, L., Dong, Y., Wang, T., **Da, C.**, Hirasaki, G. J., & Biswal, S. L. (2013). Adsorption of cationic and anionic surfactants on natural and synthetic carbonate materials. *Journal of colloid and interface science*, 408, 164-172.
- Da, Chang, et al. "Viscosity and stability of dry CO<sub>2</sub> foams for improved oil recovery." *SPE Improved Oil Recovery Conference. Society of Petroleum Engineers*, 2016.
- Da, Chang, et al. "CO<sub>2</sub>/Water Foams Stabilized with Cationic or Zwitterionic Surfactants at Temperatures up to 120° C in High Salinity Brine." *SPE Annual Technical Conference and Exhibition. Society of Petroleum Engineers*, 2018.