

Chang (Carson) Da

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EDUCATIONS:

University of Texas at Austin, Austin TX

July 2015 to present

Major: Chemical Engineering, **PhD candidate**

Cumulative GPA: 3.68

Estimated graduation date: **Spring 2021**

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**)

Lab experiences: **grafting of nanoparticles, polymer characterizations**, dynamic light scattering (DLS), zeta potential, core flood tests, titrations, **rheology**, interfacial tension (IFT), **interfacial (dilatational) elasticity**, contact angle, thermogravimetric analysis (TGA), nuclear magnetic resonance (NMR), total organic carbon (TOC), **liquid chromatography mass spectrometry (LC/MS)**, powder X-ray diffractions (XRD)

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

RESEARCH EXPERIENCE:

Optimization of Nano-Surfactant and Polymer Formulations with Low Retention on Carbonates

Aramco Research Center - Boston

June to August 2019

Graduate Research Intern

- Introduce co-surfactants and polymers to improve solubility of petroleum sulfonates in concentrated brine
- Reduce the retentions of petroleum sulfonates on carbonate rocks by more than half
- **Filed two patents** as a joint inventor

Design and Characterizations of Surface-Active Nanoparticles (NPs) for EOR Applications

The University of Texas at Austin

October 2017 to Present

Supervised by Dr. Keith Johnston (Sponsored by TOTAL S.A.)

- Synthesize ligands on silica NPs to avoid aggregations and **achieve colloidal stability in concentrated brines**
- Characterize the colloidal and interfacial behaviors of NPs to be applied in foams stabilization and wettability alteration
- **Tutor 3 undergrad researchers** and establish quarterly routines to meet project timetable of the sponsor

CO₂ Mobility Control with Viscous and Stable Foams at High Temperature in High Salinity Brine

The 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 and characterize CO₂/water foams at HTHS reservoir conditions
- Study long-term thermal stability in concentrated brine and partition coefficient in oil-water emulsions
- Demonstrate feasibility of the surfactant formulation for field application, **currently under pilot tests in UAE**

Ultra-Dry CO₂/Water Foams Stabilized with Viscoelastic Surfactants for Hydraulic Fracturing

The 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)

- Design surfactant formulations to form **entangled wormlike micelles** and thus stabilize viscoelastic foams for a month
- Prove the ability of the viscoelastic foams to carry proppants as fracturing fluids to **reduce water usage by 95%**

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

- Design and optimize for surfactant formulations with low IFT and low mineral adsorption for carbonate reservoirs
- Measure static adsorptions of various types of surfactants on carbonate minerals through potentiometric titration
- Study the physico-chemical makeups of natural carbonates in aid to design surfactant formulations with low adsorption

AWARDS & ACTIVITIES:

Teaching Assistant (Favorite TA in the Department)

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

Safety Specialist for Johnston Group

2016 to present

- Supervise lab safety performance and take charge of safety managements for all lab users
- Inspects onsite safety issues on a regular basis and collaborate with EHS stuffs to correct misbehaviors

Society of Petroleum Engineering (SPE)

2012 to present

- Present latest research highlights in technical sessions of major SPE conferences (ex. SPE IOR and SPE ATCE)

MAJOR PUBLICATIONS & CONFERENCE TALKS:

- **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 CO₂-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
- **Da, C.**, Zhang, X., Alzobaidi, S., Wu, P. & Johnston, K. P. Tuning nanoparticle surface chemistry and ionic strength to control the adsorption and dilational elasticity at the gas-brine interface. Submitted to *Langmuir* and under revisions.
- 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., Wu, P., **Da, C.**, Zhang, X., Hackbarth, J., Angeles, T., Rabat-Torki, N.J., MacAuliffe, S., Panja, S., & Johnston, K. P. (2020). Effect of surface chemistry of silica nanoparticles on contact angle of oil on calcite surfaces in concentrated brine with divalent ions. *Journal of Colloid and Interface Science*, 581, 656-668.
- Tang, W., Zou, C., **Da, C.**, Cao, Y., & Peng, H. (2020). A review on the recent development of cyclodextrin-based materials used in oilfield applications. *Carbohydrate Polymers*, 116321.
- Da, Chang, et al. "CO₂/Water Foams Stabilized with Cationic or Zwitterionic Surfactants at Temperatures up to 120° C in High Salinity Brine." *SPE Annual Technical Conference and Exhibition*, 2018.
- Da, Chang, et al. "Stable Gas-in-Water Foams at High Salinity via Manipulation of Nanoparticle Amphiphilicity." *The 93rd ACS Colloid & Surface Science Symposium*, 2019.
- Da, Chang, et al. "Highly Stable Nitrogen-in-Brine Foams with Surface-Modified Silica Nanoparticles for Enhanced Oil Recovery." *2020 AIChE Virtual Spring Meeting & 16th Global Congress on Process Safety*, 2020.