

EDUCATION

Ph.D., Chemical Engineering, Brigham Young University, Provo, Utah, USA. Feb. 2008, GPA – 3.5

M.S., Chemical Engineering, Brigham Young University, Provo, Utah, USA. July 2003, GPA – 3.5

B.E., Chemical Engineering, Bharati Vidyapeeth's College of Engineering, Pune University, Pune, India. 1999

RESEARCH EXPERIENCE

Research/Teaching Assistant,

Chemical Engineering, Brigham Young University

2000 to Present

- **Combustion of Biomass and Coal -**
 - Investigation of combustion characteristics (Temperature profiles, Ash deposition, and NO_x formation) through series of **Biomass and Coal combustion** experiments
 - Performed **CFD modeling for investigation of flame speeds and emission behavior** in gas-fired as well as coal-fired systems
 - Developed an **UDF (User-Defined Function) for predictive ash deposition model in Fluent** describing major ash impaction and capture mechanisms
 - Investigated **emissions behavior in coal-fired and co-firing systems** and experimentally demonstrated **NO_x reduction in Oxy-fuel firing systems**
 - Experienced in **CFD simulation of heat transfer systems involving radiation**
 - Investigated **radiation correction factors** for slag-coated thermocouples in pilot-scale reactors using **Fluent simulation and EES (Engineering Equation Solver) technique**
 - **Project Engineering and Management -**
 - Extended capabilities of down-fired plug flow reactor (MFR) from only 1 to 4 fuel types to over **25 fuels** (mainly **Biomass** fuels), during **oxidizing/reducing combustion experiments and emissions measurement**
 - Broadened the scope of the reactor for operating under **oxidizing, reducing, staged-air combustion as well as in oxyfuel** (mixture of CO₂ and O₂) conditions through design modifications
 - Increased reactor performance by **doubling the reactor output** through accelerated heating mechanism and an effective deposit collection system
 - Engineered a pressure-balance system that **reduced reactor feeding fluctuations by more than 50%**
 - **Breakthroughs -**
 - Demonstrated **20-40% decrease** in ash impaction efficiency by constructing a **CFD model for impaction efficiency** in real flow, validated with experiments
 - Experimentally demonstrated that proper fuel mixing leads to up to **50-60% reduction in ash deposition** and also **decreases corrosion initiation** from compounds such as alkali chlorides
 - Demonstrated that, during coal/biomass combustion, **alkali chlorides form alkali sulfates on surfaces** rather than in the gas phase
 - Demonstrated **NO_x reduction capabilities of Oxy-fuel combustion technique** through a series of experiments.
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COMPUTER SKILLS

- FLUENT™, CHEMKIN, PCGC-3, NASA Lewis & Edwards equilibrium codes, Aspen, GAMBIT
 - Mathcad, MATLAB®, LabVIEW™, IGOR Pro, EES (Engineering Equation Solver)
 - C, C++, Fortran, Visual Basic
 - Microsoft Office (Word, Excel, PowerPoint, Outlook, Access, and Project)
 - Platforms – Windows, UNIX
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TECHNICAL TRAINING

- SEM, ESEM and XRF (Elemental Analysis)
- FTIR, CHNS, GC/MS
- High-speed Image capture and Analysis

HONORS AND ACCOLADES

- **Won 2nd place outstanding paper award** for work on renewable fuel ash deposition and corrosion at the international “Science in thermal and Chemical Biomass Conversion” conference, Victoria, BC, Canada, 2004.
 - Earned **scholarship award from John Zinc Co LLC, Tulsa** during first year of Graduate Studies at BYU, Provo.
 - Ranked 1st among 500 students in chemical engineering school (India) during freshman year.
 - Achieved 15th rank in Higher Secondary Certificate (XII) Science examination from approximately 6500 candidates.
 - Achieved 27th rank in Higher Secondary Certificate (XII) General examination from approximately 10500 candidates.
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PUBLICATIONS & PRESENTATIONS

- **Lokare, S.**, “Investigation of Ash Deposition and Corrosion Mechanisms in Combustion of Biofuels and Fuel Blends in a Pilot-Scale Facility”, *Chemical Engineering, Brigham Young University*, Provo, UT, 2003
 - **Lokare, S.S.**, Dunaway, J. D.; Moulton, D.; Rogers, D.; Tree, D. R.; and Baxter, L. L., “Investigation of Ash Deposition Rates for a Suite of Biomass Fuels and Fuel Blends”, in *Energy & Fuels*, 2006. **20**(3): p. 1008-1014
 - **Lokare, S.**, Dunaway, J.D., Rogers, D., Anderson, M., Baxter, L.L., and Tree, D. “Effects of Fuel Ash Composition on Corrosion in Biomass-Fired boilers”, in *Science in Thermal and Chemical Biomass Conversion*, 2006. Victoria BC, Canada p. 157-168 (**Received 2nd place outstanding paper award**)
 - **Lokare, S.**, Moulton, D., Junker, H., Tree, D., and Baxter, L.L., “Effects of Fuel Ash Composition on Corrosion”, in *The Spring Meeting, Western States Section, The Combustion Institute*, La Jolla, CA, March, 2002
 - **Lokare, S.**, Dunaway, D., Rogers, D., Tree, D.R., Baxter, L.L., Mehta, A., Bakker, W., and Facchiano, A., “Deposition Mechanisms of High-Chlorine Coal as a Function of Stoichiometry and Tube Temperature”, in *The 28th International Technical Conference on Coal Utilization and Fuel Systems*, Clearwater, FL., 2003
 - **Lokare, S.**, Dunaway, D., Rogers, D., Anderson, M., Junker, H., Tree, D.R., Baxter, L.L., Mehta, A., Bakker, W., and Facchiano, A., “Effects of Fuel Ash Composition on corrosion Deposits”, in *The 28th International Technical Conference on Coal Utilization and Fuel Systems*, Clearwater, FL., 2003
 - **Lokare, S.**, Dunaway, D., Baxter, L., and Tree, D., “Investigation of Ash Deposition and Corrosion in Combustion of Bio-fuels and Fuel blends in a Pilot-Scale Facility”, in *The 18th Annual ACERC Conference*, Provo, Utah, February, 2004
 - **Lokare, S.**, Waclawiak, K., Tree, D., and Baxter, L., “Effect of Mercury Removal Treatment on NO_x Emission and Ash Deposition Characteristics in PC Combustion”, in *The 5th US Combustion Meeting*, San Diego, CA, 2007
 - Junker, H., Sander, B., Stitt, S., Tree, D.R., **Lokare, S.**, Baxter, L.L., Dunaway, D., Moulton, D., and Rogers, D., “Agricultural Residues for Power Production”, in *The 12th European Biomass Conference*, Amsterdam, Netherlands, 2002
 - Mackrory, A., **Lokare, S.**, Baxter, L.L., and Tree, D.R., “An Investigation of Nitrogen Evolution in Oxy-fuel Combustion”, in *The 32nd Annual Conference on Coal Utilization and Fuel Systems*, Clearwater, FL, 2007
 - Tuttle, S., **Lokare, S.**, Anderson, M., Tree, D.R., and Baxter, L., Mehta, A., Bakker, W., and Facchiano, T., “Stoichiometric Effects on Boiler Corrosion from High Chlorine and High Alkaline Coals”, in *The Spring Meeting, Western States Section, The Combustion Institute*, La Jolla, CA, March, 2002
 - Dunaway, D., **Lokare, S.**, Rogers, D., Junker, H., Tree, D., and Baxter, L., “Quantitatively Measured Ash Deposition Rates for a Suite of Biomass Fuels”, in *The Spring Meeting, Western States Section, The Combustion Institute*, La Jolla, CA, March, 2002
 - Dunaway, D., **Lokare, S.**, Anderson, M., Baxter, L., and Tree, D., “Ash Deposition Rates for a Suite of Biomass Fuels and Fuel Blends”, in *The 28th International Technical Conference on Coal Utilization and Fuel Systems*, Clearwater, FL., 2003
 - 5 Research posters presented in ACERC conference (2003-06) and STCBC conference (2006)
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REFERENCES

Prof. Larry Baxter, Chemical Engineering, Brigham Young University, Provo, UT 84602, ph: 801-422-8616,
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Prof. Thomas Fletcher, Chemical Engineering, Brigham Young University, Provo, UT 84602, ph: 801-422-6236,
E-mail: tom_fletcher@byu.edu