

VIRAJ GANDHI

PhD student in Mechanical Engineering (GPA: 3.96)
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📁 RESEARCH EXPERIENCE

○ Research Assistant – Dr. Larriba’s Lab (IUPUI)

Experimental measurements of mobility

- Examining the effect of E/n on the ion mobility and on the inelastic collisions in small ions by using TWIM-MS (Synapt) and the two-temperature theory.
- Measured the mobility of ions with a large dipole moment and planar geometry to quantify the deviations from the Mason-Schamp Equation using DMA-MS (Qstar) setup.

Implementation of the two-temperature theory in calculating ion mobility

- Aug 2019 - Present
- Developed a method to numerically calculate the ion mobility for the whole range of E/n using the first and the fourth order approximation to the two-temperature theory.
 - Competing effects between relative kinetic energy and interaction potentials are found to be responsible for peculiar $K_0 - E/n$ hump behaviours.

Identifying effects of the rotation of the ion on its mobility

- Devised a theory to calculate mobility, which captures the effect of momentum transfer between rotational and translational DoF while conserving energy
- Explored the effect of changes in CoM and Mol on ion rotation, overall collision frequency, and energy transfer upon collisions by strategically designed artificial isotopomers.

○ Research Assistant – Dr. Dalir’s Lab (IUPUI)

Multifidelity Weight Optimization of Aircraft Structures

- Aug 2017 - July 2019
- Automated load transfer between different fidelity models and connected Engineering Sketchpad with NASTRAN to perform parametric study on the internal structure and thickness of wings.
 - Compared the optimized weight of wing between different aerodynamic load transfer approaches i.e., stick model load transfer, serial and parallel fluid structure interaction (FSI)

📖 NOTABLE PUBLICATIONS

- Under review **V Gandhi**, C Larriba-Andaluz, “Predicting ion mobility as a function of the electric field for small ions in light gases.” *Analytica Chimica Acta*.
- Under review C Harrilal*, **V Gandhi***, et. al, “Measurement and Theory of Gas Phase Ion Mobility Shifts Resulting from Isotopomer Mass Distribution Changes.” *Angewandte Chemie*. *Equal contributors
- March 2021 C Vicent, V Martinez, **V Gandhi**, C Larriba-Andaluz, et. al, “Ion Mobility Mass Spectrometry uncovers guest-induced distortions in a supramolecular organometallic metallosquare” *Angewandte Chemie*.
- January 2021 **V Gandhi**, J Joe, J Dannenhoffer, H Dalir, “Rapid Design Generation and Multifidelity Analysis of Aircraft Structures.” *Aerospace Science and Technology*.
- Sept 2020 J Coots, **V Gandhi**, T Onakoya, X Chen, C Larriba-Andaluz, “A parallelized tool to calculate the electrical mobility of charged aerosol nanoparticles and ions in the gas phase.” *Journal of Aerosol Science*.
- June 2020 **V Gandhi**, C Larriba-Andaluz, “Deviations from the Mason-Schamp Equation for Small Molecules; an Ion Mobility study.” *68th ASMS Conference*.
- June 2020 C Larriba-Andaluz, **V Gandhi**, “The inadequacies of common theoretical and numerical tools to predict ion mobilities on par with experimental observations and how to overcome them.” *68th ASMS Conference*.
- February 2020 X Chen, **V Gandhi**, J Coots, Y Fan, L Xu, N Fukushima, C Larriba-Andaluz, “High resolution Varying Field Drift Tube Ion Mobility Spectrometer with diffusion autocorrection” *Journal of Aerosol Science*.

💻 PROGRAMMING & SOFTWARE EXPERIENCE

- MATLAB
- C
- Python
- EES
- NX design
- Creo
- SpaceClaim
- SolidWorks
- Ansys Fluent
- NASTRAN
- HyperMesh
- NX analysis

🎓 EDUCATION

- Aug 2019 to current **PhD in Mechanical Engineering** (3.96/4.00)
Indiana University Purdue University (IUPUI)
- Aug 2017 to July 2019 **MS in Mechanical Engineering** (3.95/4.00)
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