

# Stanford

---



## Jacob Troy Needels

Ph.D. Student in Aeronautics and Astronautics, admitted Spring 2019

### Bio

---

#### BIO

Jacob Needels is a current Ph.D. Candidate in the Department of Aeronautics and Astronautics at Stanford University. He holds a M.S. in Aeronautics and Astronautics from Stanford and a B.S. in Mechanical Engineering from the University of California, Davis. His research focuses on computational fluid dynamics for high-speed flows, with an emphasis on nonequilibrium thermochemical models and uncertainty quantification for robust vehicle design. He works on development of the SU2 open-source software, particularly focused on implementation and validation of capabilities to model multi-species reacting gases.

#### HONORS AND AWARDS

- Stanford Graduate Fellowship in Engineering, Stanford University (2018)

#### EDUCATION AND CERTIFICATIONS

- BS, University of California, Davis, Mechanical Engineering (2018)
- MS, Stanford University, Aeronautics and Astronautics (2020)

#### LINKS

- Lab Website: <https://adl.stanford.edu/>

### Publications

---

#### PUBLICATIONS

- **A new boundary layer integral method based on the Universal Velocity Profile** *Physics of Fluids*  
Cantwell, B. J., Bilgin, E., Needels, J. T.  
2022
- **SU2-NEMO: An Open-Source Framework for High-Mach Nonequilibrium Multi-Species Flows** *AEROSPACE*  
Maier, W. T., Needels, J. T., Garbacz, C., Morgado, F., Alonso, J. J., Fossati, M.  
2021; 8 (7)