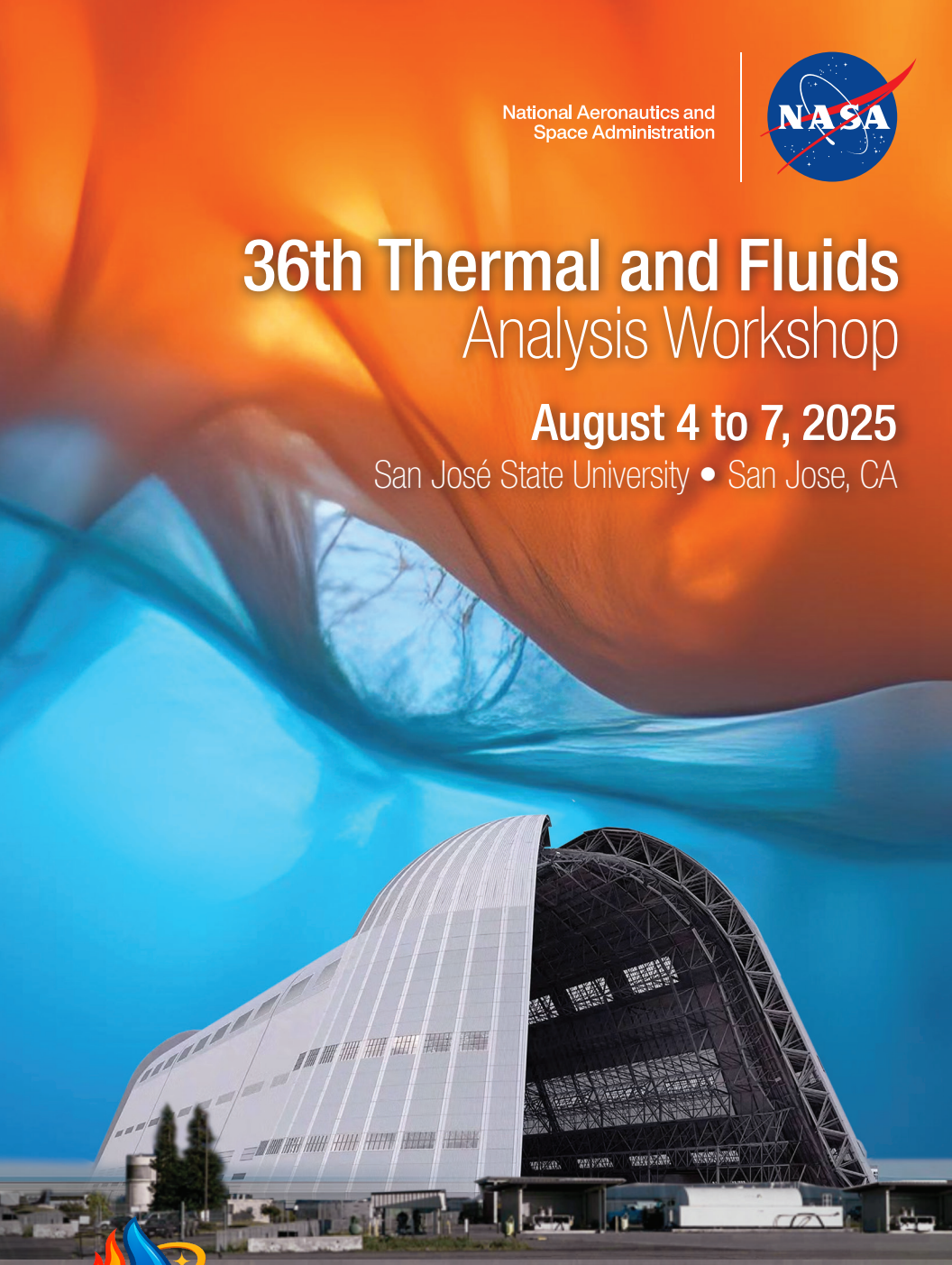
National Aeronautics and Space Administration

36th Thermal and Fluids Analysis Workshop

August 4 to 7, 2025

San José State University • San Jose, CA



THERMAL & FLUIDS
ANALYSIS WORKSHOP
Ames Research Center 2025

Ames Research Center and
NASA Engineering and Safety Center

NASA ENGINEERING & SAFETY CENTER
10
ENGINEERING EXCELLENCE

36th Thermal and Fluids Analysis Workshop

August 4 to 7, 2025

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Chairs' Welcome

On behalf of the NASA Ames Research Center (ARC), NASA Engineering & Safety Center (NESC), Analytical Mechanics Associates (AMA), and San José State University (SJSU), we are honored to welcome you to the 36th annual Thermal and Fluids Analysis Workshop (TFAWS 2025).

Since its founding in 1989, TFAWS has become NASA's premier venue for exchanging tools, techniques, and thermal and fluids analysis insights. It brings together engineers, researchers, and students from across NASA, industry, academia, and beyond to collaborate, share, and advance the state of the art.

This year's workshop offers:

- Over 100 technical presentations
- Hands-on training sessions
- Software demonstrations
- Poster presentations
- A speed mentoring session connecting early-career professionals with experienced engineers

We're also honored to welcome an outstanding group of keynote speakers:

- Mike Wright, NASA Ames Research Center
- Ethiraj Venkatapathy, NASA Ames Research Center
- Rupak Biswas, NASA Ames Research Center
- Scott Gorin, Lockheed Martin

This workshop would not be possible without the dedication of our sponsors—NASA ARC, NESC, AMA, and SJSU—and the hard work of the TFAWS Planning Team and Steering Committee. We are deeply grateful for their support.

Whether this is your first time attending or you've been part of TFAWS for years, I hope the workshop sparks new insights, valuable connections, and lasting collaborations.

Welcome—and enjoy the week ahead.

Bruno Dias & Joseph Ferguson
TFAWS 2025 Conference Chairs

Bruno Dias

THERMAL & FLUIDS
ANALYSIS WORKSHOP
Ames Research Center 2025

MONDAY | AUGUST 4, 2025

	Ballroom	Paper Session #1 Room 1-A	Paper Session #2 Room 1-B	Paper Session #3 Room 4	Classroom Room 2	Computer Lab Eng 405 & 407
8:00	Registration					
8:30	Opening Remarks in the Ballroom					
9:00 9:30	Keynote Lecture in the Ballroom					
10:00	Coffee Break					
10:30 11:00 11:30	Introduction to Orbital Mechanics and Spacecraft Attitudes for Thermal Engineers	Aerosciences 1 (Aero I)	Interdisciplinary 1 (Inter I)	Thermal Control & Protection 1 (TC&P I)	Introduction to Passive Thermal Control Technologies	GFSSP - MSFC
12:00 12:30	Lunch					
1:00	Poster Pitch in the Ballroom					
1:30 2:00 2:30	Introduction to Orbital Mechanics and Spacecraft Attitudes for Thermal Engineers	Aerosciences 2 (Aero II)	Interdisciplinary 2 (Inter II)	Thermal Control & Protection 2 (TC&P II)	Thermal Protection System Testing and Evaluation at NASA Ames Arc Jet Complex - ITAR	CFD++ - MetaComp
3:00	Coffee Break					
3:30 4:00 4:30	Modeling Complex Cryogenic Tank Thermodynamics with Simple Spreadsheet Tools	Aerosciences 3 (Aero III)	Interdisciplinary 3 (Inter III)	Thermal Control & Protection 3 (TC&P III)	Materials for Entry Systems Thermal Protection – Examples and Insights for Next Generation Reusables and Ablatives	CFD++ - MetaComp

MONDAY PAPER SESSION SCHEDULE

Timeslot	Room 1-A			Room 1-B				Room 4		
10:30-10:50	Aerosciences 1 (Aero I)	Aero I - 01	General-Purpose Machine-Learning Closure Model for Wall-Modeled LES	Adrian Lozano Duran (Caltech/MIT)	Interdisciplinary 1 (Inter I)	Inter I - 01	Three-dimensional, Multi-Phase CFD Modeling using an Overset Mesh with Free Surface to Simulate Wave Impacts on the Outer Shell of a Spacecraft	William Dziedzic (NASA KSC)	Thermal Control & Protection 1 (TC&P I)	TC&P I - 01	Learnings From a Lunar Lander - Parts 1 & 2	Jackson Sweeney (Firefly Aerospace)
10:50 - 11:10						Inter I - 02	Custom CFD and Digital Twin Frameworks for Thermo-Fluid System Optimization	Allen Nejah (SunMan Eng., Inc.)				
11:10 - 11:30						Inter I - 03	Simulation of Time-Dependent Heat Transfer in Spherical Bubbles With Application to Bubble Through Nuclear Thermal Rocket Engines	Dakota J Santana (UAH)		TC&P I - 02	Generalizing Lunar Vehicle Thermal Analysis: Lessons Learned from VIPER	Thomas B Slusser (NASA JSC)
11:30 - 11:50		Aero I - 02	Aerodynamic & Thermo-Chemical Analysis of Blended Haack-Ogive Nose Cones Across Earth & Martian Atmospheres	Tarun Prabash (RV College of Engineering)		Inter I - 04	Numerical Analysis On Tree-Shaped Disc Heat Convection	Derli Amaral (SHSU)				
1:30 - 1:50	Aerosciences 2 (Aero II)	Aero II - 01	Early Career Faculty Seminar: Roughness induced transition for hypersonic	Robyn L. Macdonald (U.C. Boulder)	Interdisciplinary 2 (Inter II)	Inter II - 01	Characterization of Spacecraft Thruster Plumes via Augmented View Factor Methods for Spacecraft Docking Interactions	Anthony C Terracciano (NASA KSC)	Thermal Control & Protection 2 (TC&P II)	TC&P II - 01	Mitigation of Superheated Vapour Formation in Cryogenic Coolant Loops of Thermal Vacuum Chambers Using Passive Flow Strategies	Vinary N Panda (Astro Ltd.)
1:50 - 2:10						Inter II - 02	Microgravity Experiment for Lunar Dust (MELD): A platform to study lunar dust interactions with surfaces.	Samantha Daigle (TWU)		TC&P II - 02	Calibration for Video Analysis with arcjetCV	Alexandre Quintart (Flying Sq)
2:10 - 2:30						Inter II - 03	Methods for Modeling Lunar Dust in Thermal Desktop Based on Lunar Dust Level Sensor and Effects on Surfaces Test Data	Jessie Beddoe (NASA JSC)		TC&P II - 03	Comparative Analysis of Thermal Straps in a Vacuum (CATS-Vac)	Mackenzie Byrnes (NASA MSFC)
2:30 - 2:50		Aero II - 02	Demonstration of Broadband Absorption Spectroscopy of CN(X2Σ+→B2Σ+) in the Low Density Electric Arc Shock Tube	Andrea Fagnani (ORAU at NASA ARC)		Inter II - 04	Simcenter System Simulation for Space Systems Design and Electrified Rocket Development	Darren Nunes (Siemens)		TC&P II - 04	IHAB Thermal Cover Assembly Omission Thermal Study.	Jonah Smith (Amentum)
3:30 - 3:50	Aerosciences 3 (Aero III)	Aero III - 01	Dragonfly: Entry, Descent, and Landing - Thermal Environment and Analysis Approach	Evan Cosentino (APL)	Interdisciplinary 3 (Inter III)	Inter III - 01	Thermal Modeling of an ESPA-Class Satellite with OHP and DSABR Architecture: A Comparative Study Using Thermal Desktop and ThermQuik	Kevin R Anderson (CPP)	Thermal Control & Protection 3 (TC&P III)	TC&P III - 01	Machine Learning-Guided Design of Ionic Liquids for Next-Generation Pumped Fluid Loops	Elif Acar (Cornell Univ)
3:50 - 4:10		Aero III - 02	Dragonfly Mission Launch Failure Analysis Aerothermal Database Development.	Christopher Naughton (NASA ARC)		Inter III - 02	Thermal Performance Evaluation of IPEx via Dynamic Modeling with Thermal Desktop and SINDA	Kevin R Anderson (CPP)		TC&P III - 02	Improving Configuration Management and Collaboration in a Thermal Analyst Workflow	Thomas B Slusser (NASA JSC)
4:10 - 4:30		Aero III - 03	Modular Trajectory Simulation Architecture for Aerocapture and Skip out Maneuvers	Bohdan Wesely (NASA ARC)		Inter III - 03	Metasurface-Engineered Anode for Solid Oxide Electrolysis Cells	Victoria Kurushina (IU of Tyumen)		TC&P III - 03	Atmospheric Waves Experiment (AWE) Thermal Control System: from Design through On-Orbit Thermal Performance	Mike Holt (SDL)
4:30 - 4:50		Aero III - 04	Preliminary Thermal Design of Airborne EO/IR Pods and Bays Based on CONOPS and Flight Envelope	Mark Whitum (Raytheon Technologies)		Inter III - 04	Speeding Up Model Correlation With Breakout Models: The Viper Integrated Thermal Model Correlation Story	Lisa Erickson (NASA JSC)		TC&P III - 04	Atmospheric Waves Experiment (AWE) Thermal Balance: Internal Characterization, Correlation, and Lessons Learned	Matt Ralphs (SDL)

TUESDAY | AUGUST 5, 2025

	Ballroom	Paper Session #1 Room 1-A	Paper Session #2 Room 1-B	Paper Session #3 Room 4	Classroom Room 2	Computer Lab Eng 405 & 407
8:00	Registration					
8:30	Opening Remarks in the Ballroom					
9:00 9:30	Keynote Lecture in the Ballroom					
10:00	Coffee Break					
10:30 11:00 11:30	Overview of the Icarus Material Response Software for TPS Analysis and Sizing	Aerosciences 4 (Aero IV)	Thermal Control & Protection 4 (TC&P IV)	Thermal Control & Protection 5 (TC&P V)	Heat Pipe Short Course	
12:00 12:30	Lunch					
1:00	Poster Pitch in the Ballroom					
1:30 2:00 2:30	Multi-Physics Systems Simulation Using GT-SUITE	Aerosciences 5 (Aero V)	Thermal Control & Protection Special ECF/ESI session	Thermal Control & Protection 6 (TC&P VI)	An Introduction to Direct Simulation Monte Carlo (DSMC)	Thermal Desktop - Ansys
3:00	Coffee Break					
3:30 4:00 4:30		Aerosciences 6 (Aero VI)	Interdisciplinary 4 (Inter IV)	Thermal Control & Protection 8 (TC&P VIII)	Introduction to PyFR: A Scalable Open-Source Flow Solver for Scale Resolving Simulations	Thermal Desktop - Ansys
5:00 5:30	Student Posters					

TUESDAY PAPER SESSION SCHEDULE

Timeslot			Room 1-A		Room 1-B		Room 4	
10:30-10:50	Aerosciences 4 (Aero IV)	Aero IV - 01	Recent Advances in Aeroheating and Thermal Protection System Material Response in the NASA Entry Systems Modeling Project	Justin Haskins (NASA ARC)	Thermal Control & Protection 4 (TC&P IV)	Megavatt-Scale Electrified Aircraft Thermal Management System Sizing	Thermal Control & Protection 5 (TC&P V)	Two-Way Shape Memory Alloy Heat Pipes for Passive Radiator Actuation	Josh R. Cannon (BYU)
10:50 - 11:10		Aero IV - 02	Exploring the Accuracy of CFD Predictions for the Wake of a Hypersonic Inflatable Aerodynamic Decelerator	Clark Pederson (NASA LaRC)		Thermal Management Through Resonant Instability in Reduced Gravity Environments		Additively manufactured ceramic heat pipes with optimized capillary structures	Giancarlo D'Orazio (Cornell)
11:10 - 11:30		Aero IV - 03	Transport-Equations-Based Transition Models for Three-Dimensional High-Speed Flows	Ethan Vogel (NASA LaRC)		Optimization of Battery Thermal Management for LEO Satellites Using Multi-Physics Modeling in GT-SUITE		3D-Printed Loop Heat Pipes for CubeSat, SmallSat, and Lunar Habitat Applications	Lawrence Bradley (ACT)
11:30 - 11:50		Aero IV - 04	Wake Heating Environments on a HIAD Aeroshell using Unstructured CFD	Adam Wise (NASA LaRC)		Development of the Orion Crew Module Adapter (CMA) T-0 Multi-Layer Insulation (MLI) Purge Flow Impingement Test and Discussion of Initial Observations		Characterization of Silicon-based Micro-Oscillating Heat Pipes	Zachary Wong (UCLA)
1:30 - 1:50	Aerosciences 5 (Aero V)	Aero V - 01	A Reimagining of NASA's DPLR Code	Joshua Finkbeiner (NASA GRC)	Thermal Control & Protection Special ECF/ESI session	Early Career Faculty Seminar: Ionic liquids for pumped fluid loop applications	Thermal Control & Protection 6 (TC&P VI)	Novel Pulsating Heat Pipes Featuring Fractals for Performance Enhancement	Md Zishan Akhter (TII)
1:50 - 2:10		Aero V - 02	Gas-Surface Interaction Models in CFD++	Bruno Lopez (Metacomp)				Thermal characterization of pulsating heat pipes for antenna and detector-plane cooling applications	Marcin Wojcik (KP Labs)
2:10 - 2:30		Aero V - 03	BLAST: Boundary Layer Analysis & Simulation Tool for Reacting Nonequilibrium Flows	Domenico Lanza (UIUC)		Early Stage Innovation Seminar: Additive manufacturing of ceramic heat pipes		High Temperature Oscillating Heat Pipe Radiator	Alex Miller (ThermAvant)
2:30 - 2:50		Aero V - 04	Aerothermodynamics of a General One-Dimensional Compressible Flow in a Duct with Area Change, Friction, Heat Transfer, Rotation, Internal Choking, and Normal Shocks: Modeling and Solution	Bijay Sultanian (TAKANIKI)				Pulsating Heat Pipe Based Electronics Cooling System	Sai Kiran Hota (ACT)
3:30 - 3:50	Aerosciences 6 (Aero VI)	Aero VI - 02	A Flight-to-Ground Mapping Strategy to Reproduce Entry Trajectory Conditions in ICP Facilities	Andrea Scaboro (UIUC)	Interdisciplinary 4 (Inter IV)	Thermal Effects of Scene-Based, Lunar Alignment for a Hyperspectral Earth Observation Telescope in Low Earth Orbit	Thermal Control & Protection 8 (TC&P VIII)	Thermal Correlation of a mechanically driven loop heat pipe for deep space science missions	Florian Sanchez (Maya HTT)
3:50 - 4:10		Aero VI - 03	Boundary Layer Characterization around Graphite Samples in Microwave Nitrogen-Methane Plasmas	Dan Fries (UKy)		The Effect Of Changing The Thickness Of VO2 Thin Films On Emissivity For Passive Thermal Control On Spacecrafts		Non-Integrated Hot-Reservoir Variable Conductance Heat Pipe Tested on Peregrine Lander	Calin Tarau (ACT)
4:10 - 4:30		Aero VI - 04	Approximate Method for Comparing NEQAIR Visible Spectral Emission Predictions Against Onboard Footage	Heston Briant (NASA KSC)		Harnessing Thermoacoustic Power with Bi-Directional Turbines: A Path to Efficient Energy Conversion		Thermal Vacuum Testing of a VIPER Loop Heat Pipe	Ezequiel Medici (NASA JSC)
4:30 - 4:50								Double Strokes Active Heat Pipe for Thermal Control	Maged Mossallam (NARSS)

WEDNESDAY | AUGUST 6, 2025

	Ballroom	Paper Session #1 Room 1-A	Paper Session #2 Room 1-B	Paper Session #3 Room 4	Classroom Room 2	Computer Lab Eng 405 & 407
8:00	Registration					
8:30	Opening Remarks in the Ballroom					
9:00 9:30	Keynote Lecture in the Ballroom					
10:00	Coffee Break					
10:30 11:00 11:30	Vendor Demo session	Thermal Control & Protection - ITAR	Cryogenics 1 (Cryo I)	Thermal Control & Protection 9 (TC&P IX)	Introduction to Homogenization Theory and Symbolic Deduction for Multiscale Modeling of Reactive Transport in Porous Media	PyFR - Texas A&M
12:00 12:30	Lunch					
1:00	Vendor Demo session in the Ballroom					
1:30 2:00 2:30	Speed Mentor Session	Thermal Control & Protection 10 (TC&P X)	Cryogenics 2 (Cryo II) Aerosciences 7 (Aero VII)	Thermal Control & Protection 11 (TC&P XI)	An Introduction to Uncertainty Quantification	Comsol
3:00	Coffee Break					
3:30 4:00 4:30		Thermal Control & Protection 12 (TC&P XII)	Aerosciences 7 (Aero VII)	Thermal Control & Protection 13 (TC&P XIII)	Advanced Machine Learning Concepts	Comsol

WEDNESDAY PAPER SESSION SCHEDULE

Timeslot	Room 1-A				Room 1-B				Room 4			
10:30-10:50	Thermal Control & Protection - ITAR	TC&P ITAR - 01	Using SINDA/Fluint for Modeling of Spacecraft Thermal Capacitance	Steven Thornton (NASA JSC)	Cryogenics 1 (Cryo I)	Cryo I - 01	Understanding Surface Rise, Frothing, and Boil-over in Cryogenic Tanks	Mark A. Wollen (Inn Eng Sol)	Thermal Control & Protection 9 (TC&P IX)	TC&P IX - 01	The Lunar Outpost Eagle Lunar Terrain Vehicle: The Mobile Lunar Science Laboratory of the Future	Izzy Golemme (Lunar Outpost)
10:50 - 11:10		TC&P ITAR - 02	Assessing HALO Radiator Thermal Coatings: Testing and Validation of Natural and Induced Environments	Aidan Svoboda (NASA JSC)		Cryo I - 02	Modeling of Superheated Bubble Condensation in Subcooled Liquid for Liquid Hydrogen Boil-Off Gas Management	Mahmood H. Alqefl (ZeroAvia)		TC&P IX - 02	The Lunar Outpost Lunar Voyage 1 MAPP Rover – Surviving a Hard Landing at the Lunar South Pole and Reaching TRL9	Kaila Pfrang (Lunar Outpost)
11:10 - 11:30		TC&P ITAR - 03	Dragonfly Multi-Mission Radioisotope Thermoelectric Generator Secondary Cooling Chiller Cart	Joshua Hess (APL)		Cryo I - 03	Modeling complex cryogenic tank thermodynamics with simple spreadsheet tools	Mark A. Wollen (Inn Eng Sol)		TC&P IX - 03	CLPS EDS Payload Thermal Design and Analysis	Melissa Young (NASA KSC)
11:30 - 11:50		TC&P ITAR - 04	Air Force Research Laboratory (AFRL)'s Thermal Roadmap for Space: Enabling the US Space Force	Columbia Mishra (SpaceForce)		Cryo I - 04	Validation of Stanton Number Correlation for Jet Mixing and Its Extension to Microgravity Filling Operations	Hong Q Yang (NASA MSFC)		TC&P IX - 04	Lunar South Pole Terrain Effects on Radiator Performance	William Birmingham (NASA MSFC)
1:30 - 1:50	Thermal Control & Protection 10 (TC&P X)	TC&P X - 01	A Study of TPS Defects using a One-Domain Porous Media Model.	Brandon van Gogh (Stanford)	Cryogenics 2 (Cryo II)	Cryo II - 01	Computational Fluid Dynamics Analysis of LOX-Methane Mixing within Confined Cylindrical Volume	Kevin Chiban (NASA KSC)	Thermal Control & Protection 11 (TC&P XI)	TC&P XI - 01	Volatiles Investigating Polar Exploration Rover (VIPER) System Integrated Thermal Vacuum Test Planning and Preparation	Jodi Turk (NASA MSFC)
1:50 - 2:10		TC&P X - 02	An Upscaled Continuum Framework with Improved Force Closure For Flow over Heterogeneous Porous Structures	Daniel Fust (Oregon State)		Cryo II - 02	Hydrophobicity of surface coatings for cryogenic liquid storage and transfer in microgravity environments	Ethan Paulsen (UN Texas)		TC&P XI - 02	FROSTE: Designing a Thermal Control System for Cryogenic Lunar Sample Return	Elijah Stewart (NASA MSFC)
2:10 - 2:30		TC&P X - 03	Phenolic Resin Thermal Response and Fracture in a Bonded-Particle Model	Andrew Santos (NASA ARC)		Cryo II - 03	Preliminary CFD Simulations of a Cryogenic Film Condensation Experiment	Justin Pesich (NASA GRC)		TC&P XI - 03	Artemis 3 Lunar Environment Monitoring Station (LEMS-A3) Thermal Control Subsystem Architecture	Juan Rodriguez-Ruiz (NASA GSFC)
2:30 - 2:50		TC&P X - 04	Improving Thermal Model Correlation With Heat Flux Sensors and Infrared Thermography	Thomas Slusser (NASA JSC)	Aerosciences 7 (Aero VII)	Aero VII - 01	Toolbox for Characterizing Uncertainty in Aerodynamic Coefficients of Space Launch Vehicles	Avery N. White (U of A)		TC&P XI - 04	The LEAF Thermal Control System – An Artemis III Deployed Instrument	Kaitlyn Baba (Space Lab Tech)
3:30 - 3:50	Thermal Control & Protection 12 (TC&P XII)	TC&P XII - 01	Thermochromic variable emissivity material thermal modeling and test correlation	Derek Hengeveld (Redwire)	Aerosciences 7 (Aero VII)	Aero VII - 02	Rarefied Gas-Dynamic Simulations for Moon Exploration	Stefano Boccelli (NASA GSFC)	Thermal Control & Protection 13 (TC&P XIII)	TC&P XIII - 01	Mapping and Modeling the Effects of Lunar Dust on Thermally Sensitive Surfaces for Heat Rejection Analysis	Brandon M Hofmann (NASA JSC)
3:50 - 4:10		TC&P XII - 02	Unsteady Measurements of Ultra-Low Permeability in Thermal Protection System Materials	Michael Renfro (UKy)		Aero VII - 03	MD-Informed CLL Gas-Surface Interaction Kernel for LEO/VLEO Atmospheres	Ahilan Appar (UKy)		TC&P XIII - 02	Infrared Spectrometry and Thermal Radiative Properties of Lunar Dust Simulants	Aravintha Raj Racichandran (UNT)
4:10 - 4:30		TC&P XII - 03	Thermal Conductivity Analysis of the Carbon Ablator FiberForm and FRCI: An Experimental Approach	Juan Rengifo (Boise State)		Aero VII - 04	Investigation of Non-Equilibrium Structures in Inert Hypersonic Shock Waves with the Twenty-Moment Equations	Ethan Rice (U Ottawa)		TC&P XIII - 03	Absorptivity and Emissivity Measurement Error Characterization of Protective Methods for Optical Property Instruments	Jessie Beddoe (NASA JSC)
4:30 - 4:50		TC&P XII - 04	SPIRRAL: A Calorimetric Testbed for Characterizing Variable Emissivity Materials in Space	Isaac Foster (AFRL)		Aero VII - 05	Rovibrational-specific QCT and master equation analysis on the CNO system for high-energy collisions	Clement Civrais (UCI)		TC&P XIII - 04	Modeling lunar dust in Thermal Desktop: the best methods and expanding to include solar flux	Eric Malroy (NASA JSC)

THURSDAY | AUGUST 7, 2025

	Ballroom	Paper Session #1 Room 1-A	Paper Session #2 Room 1-B	Paper Session #3 Room 4	Classroom Room 2	Computer Lab Eng 405 & 407
8:00	Registration					
8:30	Opening Remarks in the Ballroom					
9:00 9:30	Keynote Lecture in the Ballroom					
10:00	Coffee Break					
10:30 11:00 11:30		Thermal Control & Protection 14 (TC&P XIV)	Introduction to cryocoolers	Thermal Control & Protection 15 (TC&P XV)	Introduction to cryocoolers	
12:00 12:30	Lunch					
1:00 1:30 2:00 2:30	Tours			Interdisciplinary 6 (Inter VI)	Introduction to cryocoolers	Tours
3:00	Coffee Break					
3:30 4:00 5:00	Tours					

FRIDAY | AUGUST 8, 2025

	Tours
8:00	
8:30 9:00 9:30 10:00 10:30 11:00 11:30 12:00 12:30	Tours

THURSDAY PAPER SESSION SCHEDULE

Timeslot	Room 1-A			Room 1-B			Room 4		
10:30-10:50	TC&P XIV - 01	Injector Experiment Simulation and Experiment Design for Centrifugal Nuclear Thermal Rocket Engine	Timothy Blackman (UAH)	Inter V - 01	Thermo-Elastic Antenna Depointing Analysis Workflow	Joel Gagnon (Maya HTT)	TC&P XV - 01	Radiative heat transfer effects on environmental/thermal barrier coatings: Extended capabilities of OpenNCC's radiation solver	Makoto Endo (NASA GRC)
10:50 - 11:10	TC&P XIV - 03	Thermal Considerations For 2039 Opposition Class Nuclear Electric Propulsion/Chemical Propulsion Crewed Mars Mission	Tai Valdes (NASA LaRC)	Inter V - 02	Permeability Evaluation Of Laser Powder Bed Fusion Printed Wick Structures For Passive Heat Transfer In Space Applications	Jiajun Xu (UDC)	TC&P XV - 02	A Mathcad model to perform orbital vehicle ascent aerothermal analysis to determine the vent size to maintain the pressure load within required limit	Siraj Jalali (NASA JSC)
11:10 - 11:30	TC&P XIV - 04	Investigation Of Injector Driven High-Frequency Combustion Instabilities	Jonathan Contreras (SJSU)	Inter VI - 01	Characterization of Lunar Thermal Environments: Terrain Effects on Environmental Sink Temperature	Will Grier (NASA LaRC)	TC&P XV - 03	Multi Mission Thermal Control Subsystem Design for Space Exploration Camera (Space Eye)	Massimiliano Mastrogiorgio (Gamma Tech)
11:30 - 11:50				Inter VI - 02	Thermal Systems Engineering for Nuclear Electric Propulsion High Temperature Radiator Arrays	Will Grier (NASA LaRC)	TC&P XV - 04	Designing and Manufacturing a 1U CubeSat Propulsion Unit with Additive Manufacturing	Edward Choi (SJSU)
	Thermal Control & Protection 14 (TC&P XIV)			Interdisciplinary 5 (Inter V)			Thermal Control & Protection 15 (TC&P XV)		

TFAWS Technical Courses, Hands-On Courses, Demonstrations

Monday 8/4/25

Technical Course: Introduction to Orbital Mechanics and Spacecraft Attitudes for Thermal Engineers (Steve Rickman – NASA JSC)

10:30 am – 12:00 pm & 1:30 – 3:00 pm • Ballroom

This course provides a theoretical background on orbital mechanics and spacecraft attitudes and applies these concepts to problems of interest to spacecraft thermal engineers. After a brief review of vector and matrix operations, the two-body problem is explored in detail. The governing differential equation is derived and conservation of specific mechanical energy and specific angular momentum are discussed. Kepler's laws are derived and presented with illustrative examples. Orbit perturbations are introduced and the effects on the orbit are discussed. The orbit beta angle is derived and the variation of beta over time is explored. An expression for orbit eclipse is derived and examples are presented. Advanced orbit concepts are briefly discussed. Finally, spacecraft reference frames and attitudes are discussed and a mathematical framework for transforming spacecraft attitudes is presented. Calculation of heating to transformed spacecraft surfaces is demonstrated.

Technical Course: Introduction to Passive Thermal Control Technologies (Holly Mortensen & Matt Ralphs – Space Dynamics Laboratory)

10:30 am – 12:00 pm • Room 2

This short course will introduce common passive thermal control technologies at a beginner to intermediate level. It will cover the following: thermal straps (metallic, graphite, and braid types), conductor bars, radiators (traditional and honeycomb), and thermal switches. Details such as materials, general performance capabilities, common use applications, when to use which technology, design considerations, and unit testing will be discussed. A brief overview of related active thermal control technologies (heat pipes, TECs, cryocoolers), in the context of how they compare to the discussed passive thermal control technologies, will be included to enable informed selection of the best technology for a given application.

Technical Course: Thermal Protection System Testing and Evaluation at NASA Ames Arc Jet Complex – ITAR (Jonathan Morgan – NASA ARC)

1:30 – 3:00 pm • Room 2

The testing of thermal protection systems in the arc-jets for use in NASA entry descent and landing systems offers rare insight into how the system performs when entering the atmosphere of a planet. Designing the test program and the test hardware is critical to minimizing residual risk to a project and maximizing the return on investment from an expensive experiment. This presentation will provide an overview of the NASA Ames Arc Jet Complex and establish how testing may be implemented for programs both small and large. In addition, new diagnostics and non-destructive evaluation methods will be suggested to create rich data sets for systems and material investigations. Correlations and relationships will be provided to quickly estimate test conditions, and lessons learned with examples from recent testing will be shared so that future test programs may avoid pitfalls that can incur costly delays.

TFAWS Technical Courses, Hands-On Courses, Demonstrations

Monday 8/4/25

Technical Course: Materials for Entry Systems Thermal Protection – Examples and Insights for Next Generation Reusables and Ablatives (Peter Marschall & Adam Caldwell & Don Ellerby – NASA ARC)

3:30 – 5:00 pm • Room 2

Heatshields materials play a critical role during the initial portions of atmospheric entry in protecting a vehicle, and its payload, from the extreme aerothermal heating. Typical entry profiles lead to aggressive heating rates and high surface temperatures but limited total heat loads, leading to large thermal gradients. In this talk, two very different sets of materials will be considered which both aim to perform in these strenuous conditions. These thermal protection systems (TPS) are the Reusable Surface Insulation (RSI), primarily of interest to commercial space, and 3D Woven Mid-Density Carbon Phenolic (3MDCP), which has been baselined for the Mars sample return Earth entry.

Demonstration: Modeling Complex Cryogenic Tank Thermodynamics with Simple Spreadsheet Tools (Mark Wollen – Innovative Engineering Solutions)

3:30 – 5:00 pm • Ballroom

A frequent problem in cryogenics involves safe and predictable management of liquids in tanks. Heat leakage into a tank of cryogenic liquid will raise vapor pressure and require periodic venting for tank pressure control. Often, the tank will need to be pressurized to suppress boiling and feed the liquid to pumps, or to transfer it to another tank. Ullage pressurization, as well as heat leakage into the ullage gas, will often result in stratified ullage gas and upper tank wall temperatures well above liquid temperature. If the tank is then disturbed (such as a vehicle tank in motion), liquid splashing or sloshing can lead to quenching of hot upper tank walls with cold liquid, or mixing of cold liquid with the hot ullage gas above, causing abrupt tank pressure excursions.

All of the above phenomena, and more, can be modelled analytically to various levels of fidelity. The simplest thermodynamics model capturing much of the critical phenomena consists of a single liquid node, a single ullage node, and two wall nodes corresponding to the tank wall sections exposed to liquid and ullage. This short course explains how a simple model can be implemented using a few spreadsheets, and demonstrates that this type of model can provide fairly accurate results in a timely fashion. Furthermore, this model can provide insight and understanding of the critical physics principles, which may be obscured when using more complex analytical methods.

The fidelity of this simple analytical model is largely dependent on proper selection of various heat and mass transfer coefficients. These coefficients can be obtained from test (or flight) data, from CFD analysis of specific events over limited simulation time intervals, or from use of classic convection, conduction, and radiation heat transfer theory. Selection of suitable heat and mass transfer coefficients will be briefly discussed, and analytical modeling results of some actual tank operations data will be presented. (Continued on pg 14)

TFAWS Technical Courses, Hands-On Courses, Demonstrations

Monday 8/4/25

Following the thermodynamics background and modelling discussion, a hands-on demonstration is planned, where the described thermodynamic tools and spreadsheet model will be "validated" by simulating the thermodynamic behavior of fluids in the boiler of an espresso machine. It is worth noting that none of the fluid physics or thermodynamics in a large cryogenic tank are any more complex than what is occurring in a small heated vessel or pot of boiling water.

Hands-On Course: Introduction to Generalized Fluid System Simulation Program (GFSSP) (Andre Leclair – NASA MSFC)

10:30 am – 12:00 pm • Computer Lab Eng 405 & 407

GFSSP is a general-purpose computer program developed at NASA/Marshall Space Flight Center for analyzing steady state and time-dependent flow rates, pressures, temperatures, and concentrations in a complex flow network. The network is divided into fluid nodes connected by branches. Conjugate heat transfer may be added with solid nodes which connect to fluid nodes through convection conductors.

Hands-On Course: An Introduction to Thermal-Fluid Analysis in CFD++ (Prasanth Kachgal & Bruno Lopez – MetaComp)

1:30 – 3:00 pm & 3:30 – 5:00 pm • Computer Lab Eng 405 & 407

TFAWS Technical Courses, Hands-On Courses, Demonstrations

Tuesday 8/5/25

Demonstration: Overview of the Icarus Material Response Software for TPS Analysis and Sizing (Joseph Schulz & Olivia Schroeder – NASA ARC)

10:30 am – 12:00 pm • Ballroom

Icarus is a multi-dimensional, unstructured, finite-volume material response model for spacecraft thermal protection systems. It is capable of modeling thermal energy transport in multilayer stacks of ablating and non-ablating materials and provides design tools for assessing thermal protection material performance with uncertainty quantification for current and future NASA missions. In addition to summarizing the governing equations and numerical methods, the discussion will emphasize the modeling assumptions commonly used in engineering material response models and how those models are validated using experimental data. The tutorial will present a series of applications ranging in complexity from uncoupled, one-dimensional, multi-material simulations to multi-dimensional, coupled flow and material simulations. The demonstrations problems are chosen based on our recent experience of using Icarus for the analysis of the thermal protection system of the Dragonfly entry vehicle.

Technical Course: Heat Pipe Short Course (Bill Anderson & Calin Tarau – Advanced Cooling Technologies)

10:30 am – 12:00 pm • Room 2

This Heat Pipe Short Course by Advanced Cooling Technologies, Inc. (ACT) will provide a broad overview of heat pipes for Spacecraft Thermal Control, including operating principles, limitations, design considerations, applications, and testing.

After discussing the basics, the course will discuss heat pipe design, including heat pipe limits, and envelope/fluid selection. Different kinds of heat pipes will be discussed, including Constant Conductance Heat Pipes (CCHPs), Variable Conductance Heat Pipes (VCHPs), Pressure Controlled Heat Pipes (PCHPs), diode heat pipes (one-way heat transfer) and gravity-aided heat pipes (thermosyphons). Design constraints, modeling, and manufacturing/testing of CCHPs for spacecraft thermal control will be covered. Pulsating (Oscillating) Heat Pipes will be covered, including when they should be considered. The course will then discuss copper/water heat pipe design and applications in space.

Technical Course: An Introduction to Direct Simulation Monte Carlo (DSMC) (Derek Liechty – NASA LaRC)

1:30 – 3:00 pm • Room 2

This short course will give a high-level overview of the direct simulation Monte Carlo (DSMC) method. It will begin with a description of the computational method and practical limits of the method's applicability. This will be followed by a sample of various applications the method is used for at the NASA Langley Research Center. Next, an overview of the details and implementation of collisional relaxation and physical interaction models will be given. Finally, we will explore some recent efforts to promote consistency of models used between CFD and DSMC.

TFAWS Technical Courses, Hands-On Courses, Demonstrations

Tuesday 8/5/25

Demonstration: Multi-Physics Systems Simulation Using GT-SUITE Gamma Tech (Gautham Ramchandran & Miles Melka & Massimiliano Mastrogiorgio – Gamma Technologies)

1:30 – 3:00 pm • Ballroom

Do you simulate complex systems including multiple physical domains: fluids, thermal, electrical, battery, chemistry, mechanics and controls? Are you looking for a simulation tool that runs faster than 3D CFD, but powerful enough to provide predictive answers to highly transient problems? Would you like an easy-to-use tool with both a 2D sketchpad and 3D building options? If so, we welcome you to learn about how GT-SUITE can be used for solving multi-physics related problems of complex systems including cryogenic propulsion, rocket engines, two-phase flow systems, fuel cell and electric vehicles, Li-ion battery thermal in this 1.5-hour software demonstration.

About Gamma Technologies: GT-SUITE simulation software is a unique transformational all-in-one CAE tool used at NASA and over 800 aerospace and automotive organizations. It is recognized to be a worldwide leader in high-level 0D/1D/3D system modeling with built-in structural and thermal 3D FEA, 3D multi-body dynamics with flexible bodies, 3D CFD and metamodels powered by Machine Learning. These are complemented by CAD modeling and automatic model generation from CAD.

Technical Course: Introduction to PyFR: A Scalable Open-Source Flow Solver for Scale Resolving Simulations (Freddie David Witherden – Texas A&M)

3:30 – 5:00 pm • Room 2

This course provides an introduction to the high-order flow solver PyFR. It will cover the architecture of PyFR, its advantages over traditional solvers, and include hands-on experience in setting up PyFR and running various simulations. Guidance will also be provided on running PyFR in parallel, along with details on simulation post-processing, including novel in-situ visualization capabilities. Best practices and tips for debugging simulations will also be discussed.

Hands-On Course: Thermal Desktop – Ansys

1:30 – 3:00 pm & 3:30 – 5:00 pm • Computer Lab Eng 405 & 407

Work through tutorials for thermal, radiation, and fluid modeling.

TFAWS Technical Courses, Hands-On Courses, Demonstrations

Wednesday 8/6/25

Technical Course: Introduction to Homogenization Theory and Symbolic Deduction for Multiscale Modeling of Reactive Transport in Porous Media (Ilenia Batiatto – Stanford University & Kyle Pietrzyk – LLNL)

10:30 am – 12:00 pm • Room 2

Porous media play a critical role in many engineering applications, ranging from batteries to thermal protection systems. Modeling and prediction of fluids and reacting species in heterogeneous porous structures remains a major open challenge in computational physics because of the inherent multiscale nature of such engineering systems, where the relevant scales of interest can easily span 6-10 orders of magnitude.

This short course is articulated in two parts. The first part will include 1) an introduction of the well-established upscaling theory, homogenization by multiple scale expansions, 2) applications to toy-problems involving flow and reactive transport through porous media, and 3) a presentation of the workflow to implement such theory numerically. Challenges related to applying the theory on physical systems of realistic complexity will be discussed. The second part will focus on the automation of homogenized model derivation using methods in symbolic deduction. In particular, we will detail the symbolic computational algorithms and functions behind Symbolica, a framework for automating and accelerating upscaled model derivation. Example problems related to reactive transport in porous media and heat transfer in electric vehicle battery modules will be explored to illustrate the utilization, benefits, and capabilities of Symbolica. The overall objective of this course is to offer the foundational knowledge and framework to integrate automated symbolic deduction capabilities with numerical computation in the context of upscaling theories for multiscale model development.

Technical Course: An Introduction to Uncertainty Quantification (Annabel del Val – University of Minnesota)

1:30 – 3:00 pm • Room 2

Nowadays, engineers are pushing the limits of both simulations and experiments to understand better than ever the intricacies of complex systems and their operational environment. However, no model or experiment is ever perfect. To have truly predictive scientific outcomes we need to model the uncertainty affecting our predictions. Furthermore, this uncertainty can be used to inform margin policies and reliability measures for different systems. In this talk, I will provide a comprehensive introduction to Uncertainty Quantification (UQ). Traditionally, the topic is introduced by first exploring the most fundamental mathematical aspects and building up the complexity to the point where different analyses of interest can be carried out. This talk, however, will adopt a task-oriented structure where we will first go over the different scientific questions that UQ can answer followed by introductions to forward propagation of uncertainty, sensitivity analysis, and backward propagation of uncertainty or Bayesian inference. A representative aerothermodynamics problem will be used throughout the talk to illustrate the concepts with practical examples. No obscure mathematical abstractions will be used in this talk.

TFAWS Technical Courses, Hands-On Courses, Demonstrations

Wednesday 8/6/25

Technical Course: **Advanced Machine Learning Concepts (JB Scoggins – NASA LaRC)**

3:30 – 5:00 pm • Room 2

This short course aims to provide attendees with an introduction to advanced Scientific Machine Learning (SciML) topics and practical guidelines for implementing Physics-Informed Neural Networks (PINNs) and creating advanced Surrogate Models from data. A general supervised learning framework will be presented with a focus on regression, followed by an overview of PINNs for solving partial differential equations. Common pitfalls and mitigation strategies will be discussed in the context of a practical application to hypersonic blunt body wake flows. If time permits, additional SciML methodologies will also be presented, including Gaussian Process Regression and Deep Symbolic Regression, with real world examples based on the speaker's experience working on NASA aeroheating projects. The course will assume a broad knowledge of topics in probability and linear algebra.

Hands-On Course: **PyFR (Freddie David Witherden – Texas A&M)**

10:30 am – 12:00 pm • Computer Lab Eng 405 & 407

This course provides an introduction to the high-order flow solver PyFR. It will cover the architecture of PyFR, its advantages over traditional solvers, and include hands-on experience in setting up PyFR and running various simulations. Guidance will also be provided on running PyFR in parallel, along with details on simulation post-processing, including novel in-situ visualization capabilities. Best practices and tips for debugging simulations will also be discussed.

Hands-On Course: **Introduction to Using COMSOL Multiphysics® for Thermal and Fluid Simulations**

1:30 – 3:00 pm & 3:30 – 5:00 pm • Computer Lab Eng 405 & 407

Get started with the modeling workflow in the COMSOLMultiphysics® software during a hands-on web workshop. We will begin with an overview of the functionality in the software for simulating heat transfer and fluid dynamics. Then, we will walk you through how to build a model from scratch using the COMSOL Multiphysics® software — and you can follow along from your own computer using a free trial. You will leave the event with new skills that can be applied when working on your own models and applications.

TFAWS Technical Courses, Hands-On Courses, Demonstrations

Thursday 8/7/25

Technical Course: **Introduction to cryocoolers (Ali Kashani – NASA GRC)**

10:30 am – 12:00 pm & 1:30 – 3:00 pm • Room 2

Cryocoolers are devices that provide cooling from ~10 mK to 150 K. These systems are applied in many fields, e.g., science, space, military, transportation, and medical. Operating principles of the different cryocoolers vary significantly. This short course describes the regenerative and recuperative cryocoolers that are employed above ~2 K as well as magnetic and dilution coolers that are used for achieving temperatures in the mK range. Applications of the different cryocooling systems will also be discussed. Finally, a commercial software tool for modeling regenerative cryocoolers will be introduced.

TFAWS Vendor Demo session - Ballroom

Wednesday 8/6/25

10:30 – 10:40 am:	Spacedesign Corporation
10:40 – 10:50 am:	Firefly Aerospace
11:00 – 11:10 am:	Maya Heat Transfer Technologies (HTT) Ltd.
11:10 – 11:20 am:	Microsanj
11 20 – 11:30 am:	Redwire (Veritrek)
11:30 – 11:40 am:	Sunman Technologies
11:40 – 11:50 am:	ThermAvant Technologies
1:00 - 1:10 pm:	Advanced Cooling Technologies
1:10 - 1:20 pm:	Siemens Energy

TFAWS Poster Pitch session - Ballroom

Monday 8/4/25

1:00 PM: **A coupled fluid-structure simulation for fracturing hydrometeors under hypersonic shock conditions —** *Michael Belair (University of Kentucky)*

1:02 PM: **A Passive Thermal Control Architecture for a Variable Altitude Controlled Aerobot On Venus —** *Mike Pauken (NASA JPL)*

1:04 PM: **An integrated framework for phase-change quantification of atmospheric ice particles —** *Carlos Americo (University of Kentucky)*

1:06 PM: **Bridging Experiments and Simulations: Stagnation Flow Reactor Studies on Vitreous Carbon Ablation —** *Davide Del Cont-Bernard (Department of Mechanical Engineering, University of Minnesota, Minneapolis (MN), United States)*

1:08 PM: **Computational modeling and validation of radiative coefficients of porous composite materials —** *Ayan Banerjee (University of Kentucky)*

1:10 PM: **Development of a laser-heated facility to investigate coking in ablators —** *Francisco Torres-Herrador (New Mexico State University)*

1:12 PM: **Enhancing Mars Sample Integrity Through Combined Regolith Insulation and Bio-Based Phase Change Thermal Buffering —** *Yuga Madalagi (Coppell High School Student)*

1:14 PM: **Evaluation of a Novel High-Temperature Three-Dimensional (3D) Printed Ceramic for Rapid Prototyping in High Enthalpy Environments —** *Melanie Reym (NASA LaRC)*

1:16 PM: **Flow Characteristics of Supersonic Oscillating Jets —** *Shabnam Mohammadshahi (New Mexico State University)*

1:18 PM: **Lunar and Martian Regolith-Based Ceramic Glazes for Thermal and Dust Protective Coatings —** *Vanessa Bristow (University of North Texas)*

1:20 PM: **Numerical investigation of the hypersonic boundary layer transition over a blunt cone using high-order discontinuous Galerkin methods —** *Antoine Ghyoot (von Karman Institute for Fluid Dynamics)*

TFAWS Poster Pitch session - Ballroom

Tuesday 8/5/25

1:00 PM: **On board spectral analysis of atmospheric re-entry plasmas for HyCUBE missions —** *Grayson LaCombe (Department of Mechanical Engineering, University of Minnesota)*

1:02 PM: **Optimizing Hypersonic Thermal Protection Systems Using AI and Quantum-Inspired Algorithms —** *Ponmanikandan Ponraj (Fahaheel Al-Watanieh Indian Private School, Kuwait)*

1:04 PM: **Performance Enhancement of Oscillating Heat Pipes Through Use of Novel Channel Cross-Sections —** *Michael Ellerbe (California State University, Northridge)*

1:06 PM: **Precision Electromagnetic Damping and Adaptive Landing System (PEDALS) —** *Ralph Elias (San José State University)*

1:08 PM: **Reconstruction and Uncertainty Quantification of Atmospheric Entry Heat Loads Using a Green's Function Approach —** *Kenneth McAfee (University of Maryland)*

1:10 PM: **TechEdSat Star Tracker —** *Marcus Gonsalves (San José State University)*

1:12 PM: **Thermal Modeling of Variable Emittance Material Coatings on CubeSats —** *Javier Solis (University of North Texas)*

1:14 PM: **Thermal Performance Evaluation of a Meander-Shaped Low-Fill Heat Pipe Using Water and Ethanol —** *Shotaro Oshima (Aoyama Gakuin University, Kanagawa, Japan)*

1:16 PM: **Hall Effect Thruster —** *Igor Eramov (San José State University)*

1:18 PM: **Biological Satellite —** *Igor Eramov (San José State University)*

Speaker

Monday, August 4, 2025

Dr. Michael J. Wright

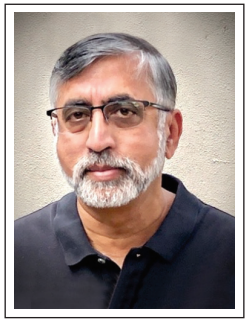
Dragonfly Entry, Descent and Lander Release: A Risk Management Perspective

Abstract: Dragonfly is the fourth NASA New Frontiers mission and will send an MMRTG-powered rotorcraft lander to the surface of Titan to study the composition of a wide variety of surface sites and complete the first comprehensive in situ study of Titan's chemical diversity and complexity. The spacecraft will launch in 2028 and arrive at Titan in 2034. This presentation will provide an overview of the concept of operations for the Entry, Descent and Lander Release phase that is designed to ensure the safe delivery of this unique "relocatable lander" to Titan, with an emphasis on some of the key technical challenges that the team has addressed during development, through the lens of Risk Management.

Bio: Michael Wright received his PhD in Aerospace Engineering from the University of Minnesota in 1997 and has worked at NASA Ames Research Center for twenty-six years, specializing in Entry, Descent and Landing systems and technologies, aerothermodynamics, and thermal protection systems. He is the primary developer of the aerothermodynamics code "DPLR", 2007 NASA software of the year, and has supported EDL for many flight missions, including the Shuttle Orbiter, Stardust, Phoenix, and Huygens, Orion, and MSL. Michael is currently the acting lead of the Agency EDL System Capability Leadership Team and is the EDL Phase Lead for the Dragonfly Mission to Titan. Dr. Wright is an Associate Fellow of the AIAA and the recipient of the 2023 AIAA Thermophysics Award. Michael has co-authored more than 90 publications in the field, winning the AIAA Best Thermophysics paper award twice.

Speaker

Tuesday, August 5, 2025



Dr. Ethiraj Venkatapathy

Innovating NASA Entry Systems: Addressing Needs and Exploring the Future

Abstract: Numerous commercial space companies are venturing into reentry missions from Low Earth Orbit (LEO). However, their lack of in-house capabilities and expertise in entry systems presents significant challenges. These companies are faced with two main options: investing time and resources to develop their own expertise or using resources to leverage existing outside capabilities through partnerships.

This keynote will propose pathways for NASA to realign its focus, strengthen its capabilities, and prepare its workforce to meet the demands of the future. By fostering collaboration with commercial companies, NASA not only plays a pivotal role in expanding the space economy but also helps maintain U.S. leadership in space exploration. Together, NASA and its partners stand poised to redefine what is possible, unlocking the mysteries of the cosmos and inspiring generations to come.

Bio: Ethiraj Venkatapathy, known as "Raj," has served as NASA Senior Technologist for Entry System Technologies for the past eight years. He also holds the position of Chief Technologist within the Entry Systems and Technology Division at NASA Ames, a role he has fulfilled for over 23 years. Currently, his work focuses on advancing entry systems and technologies for the commercial space industry, developing thermal protection systems (TPS) for robotic in-situ science missions—including aerocapture—and mentoring the next generation of technologists.

Raj's contributions have been widely recognized through numerous prestigious awards. In 2024, he received the Presidential Rank Award. In 2022, he was honored with the IPPW's Al Seiff Award. He is a two-time recipient of NASA's Outstanding Leadership Medal (2007, 2010) and has been awarded the Exceptional Technology Achievement Medal (2012), the "NASA Game Changer of the Year" Award (2015), and the "STMD Leadership" Award (2015). These accolades highlight his pivotal role in advancing revolutionary technologies for NASA and the nation.

Speaker

Wednesday, August 6, 2025

Dr. Rupak Biswas

Latest Exploration Technologies @ NASA Ames

Bio: Dr. Rupak Biswas is the Director of Exploration Technology at NASA Ames Research Center, Moffett Field, Calif., and has held this Senior Executive Service (SES) position since January 2016. In this role, he is in charge of planning, directing, and coordinating the technology development and operational activities of the organization that comprises of advanced supercomputing, human systems integration, intelligent systems, and entry systems technology. The directorate consists of over 900 staff with an annual budget of $246 million and includes two of NASA's critical and consolidated infrastructures: arc jet testing facility and supercomputing facility. Dr. Biswas received his Ph.D. in Computer Science from Rensselaer in 1991 and has been at NASA ever since. During this time, he has received several NASA awards, including the Exceptional Achievement Medal and the Outstanding Leadership Medal (twice). In addition, he received the Presidential Rank Award for Meritorious Executive in 2021. He is an internationally recognized expert in high performance computing and has published more than 170 technical papers, received many Best Paper awards, edited several journal special issues, serves on the IEEE/ACM Supercomputing Conference Steering Committee, and given numerous lectures around the world.

Speaker

Thursday, August 7, 2025

Dr. Scott Gorin

Systems Integration Across the Life Cycle

Abstract: Overview of Systems Engineering Integration across the product life cycle as design and analysis efforts address customer needs and objectives throughout a Hypersonics system development.

Bio: Scott Gorin is an Associate Fellow & Principal Systems Engineer at Lockheed Martin with almost 30 years of developing and demonstrating hypersonic technologies through flight-testing complex systems. While leading hypersonic research and development efforts focusing on next generation technologies for materials, sensors, and avionics, he established common architectures and integrated flight sciences analysis flows for multiple flight test configurations. Scott continues to develop in-house hypersonics critical skills training materials to facilitate knowledge transfer and reduce necessary comprehension ramp up time. Mr. Gorin also manages and maintains a conceptual idea and innovation development maker lab at Lockheed Martin for its employees.

36th Year TFAWS Host

Ames Research Center

Acknowledgments

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Guest Speakers
Dr. Eugene Tu
Dr. Michael J. Wright
Dr. Ethiraj Venkatapathy
Dr. Rupak Biswas
Mr. Scott Gorin

Special Thanks
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Main Campus

SJSU SAN JOSÉ STATE UNIVERSITY

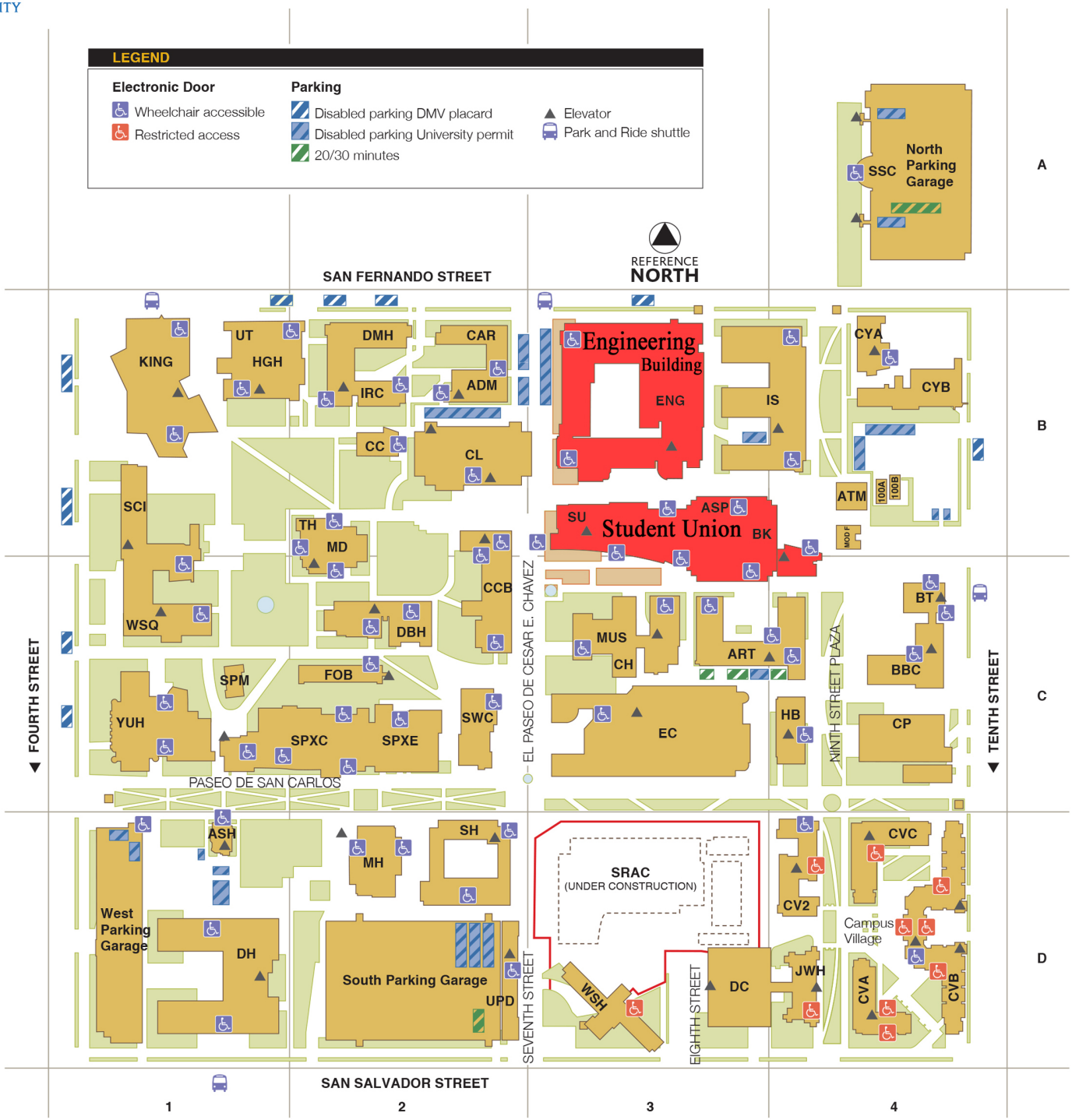
BUILDING	LOCATION
A Modular A	D3
ADM Administration	B2
AQX Aquatics Center	D3
ART Art Building	C3
ASH Associated Students House	D1
ASP AS Print Shop	B3
ATM	B4
BBC Boccardo Business Complex	C4
BK Bookstore	B3
BT Business Tower	C4
CAR Career Center	B2
CC Computer Center	B2
CCB Central Classroom Building	C2
CH Concert Hall	C3
CL Clark Hall	B2
CP Cooling Plant	C4
CVA Campus Village A	D4
CVB Campus Village B	D4
CVC Campus Village C	D4
CV2 Campus Village 2	D4
CYA Corporation Yard A	B4
CYB Corporation Yard B	B4
DC Dining Commons	D3
DH Duncan Hall	D1
DMH Dudley Moorhead Hall	B2
DBH Dwight Bentel Hall	C2
EC Event Center	C3
ENG Engineering Building	B3
FOB Faculty Offices	C2
HB Health Building	C4
HGH Hugh Gillis Hall	B1
IRC Instructional Resource Center	B2
IS Industrial Studies	B4
JWH Joe West Hall	D4
KING Dr. Martin Luther King, Jr. Library	B1
MH MacQuarrie Hall	D
MD Morris Dailey Auditorium	B2
MOD F Modular	B4
100A Modular	B4
100B Modular	B4
MUS Music Building	C3
SCI Science Building	C1
SH Sweeney Hall	D2
SPM Spartan Memorial	C1
SPXC Spartan Complex Central	C2
SPXE Spartan Complex East	C2
SRAC Student Recreation and Aquatic Center	D3
SSC Student Services Center	A4
SWC Student Wellness Center	C2
SU Diaz Compean Student Union	B3
TH Tower Hall	B2
UPD University Police Department	D2
UT University Theatre	B1
WSH Washburn Hall	D3
WSQ Washington Square Hall	C1
YUH Yoshihiro Uchida Hall	C1

Parking Garages

North at Tenth Street	A4
West at Fourth Street	D1
South at Seventh Street	D2

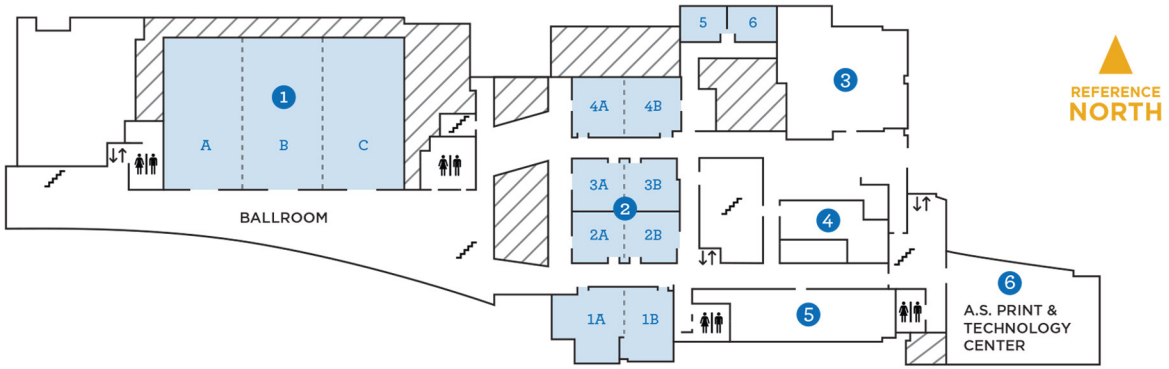
Food/Coffee

CVB	D4
KING	B1
MH	D2
SU	B3



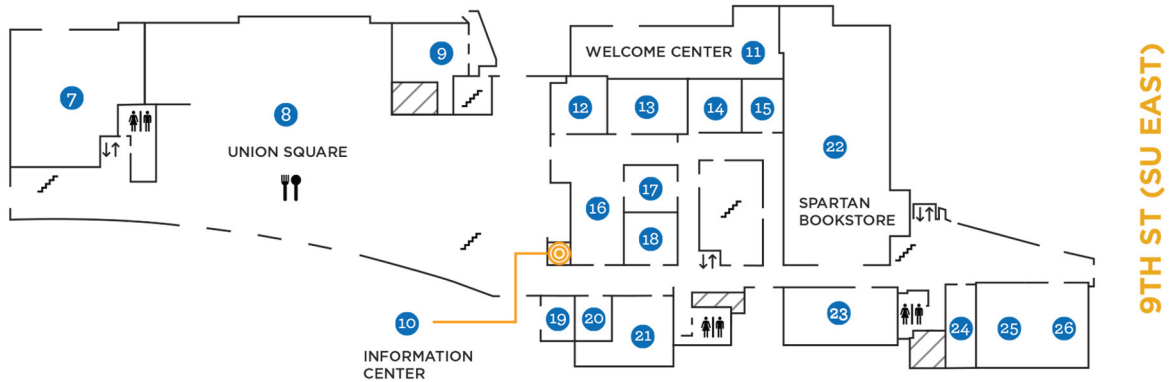
SJSU | STUDENT UNION BUILDING MAP

UPPER LEVEL



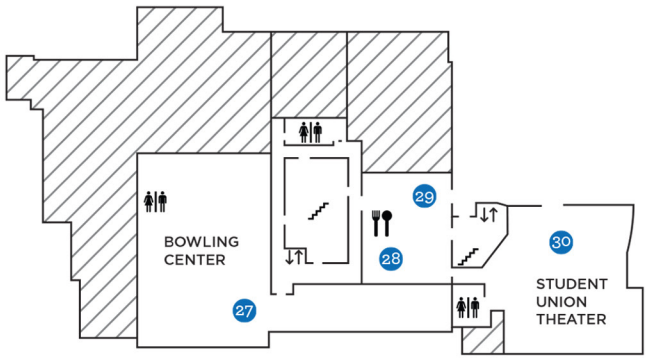
GROUND LEVEL

7TH ST (SU WEST)



9TH ST (SU EAST)

LOWER LEVEL



MAP LEGEND

- *Restrooms*
- *Stairs*
- *Elevator*
- *Dining*

UPPER LEVEL

1. Ballroom A, B, C
2. Meeting Rooms
3. Student Union Administration
4. Event Services
5. Associated Students Government
6. Associated Students Print and Technology Center

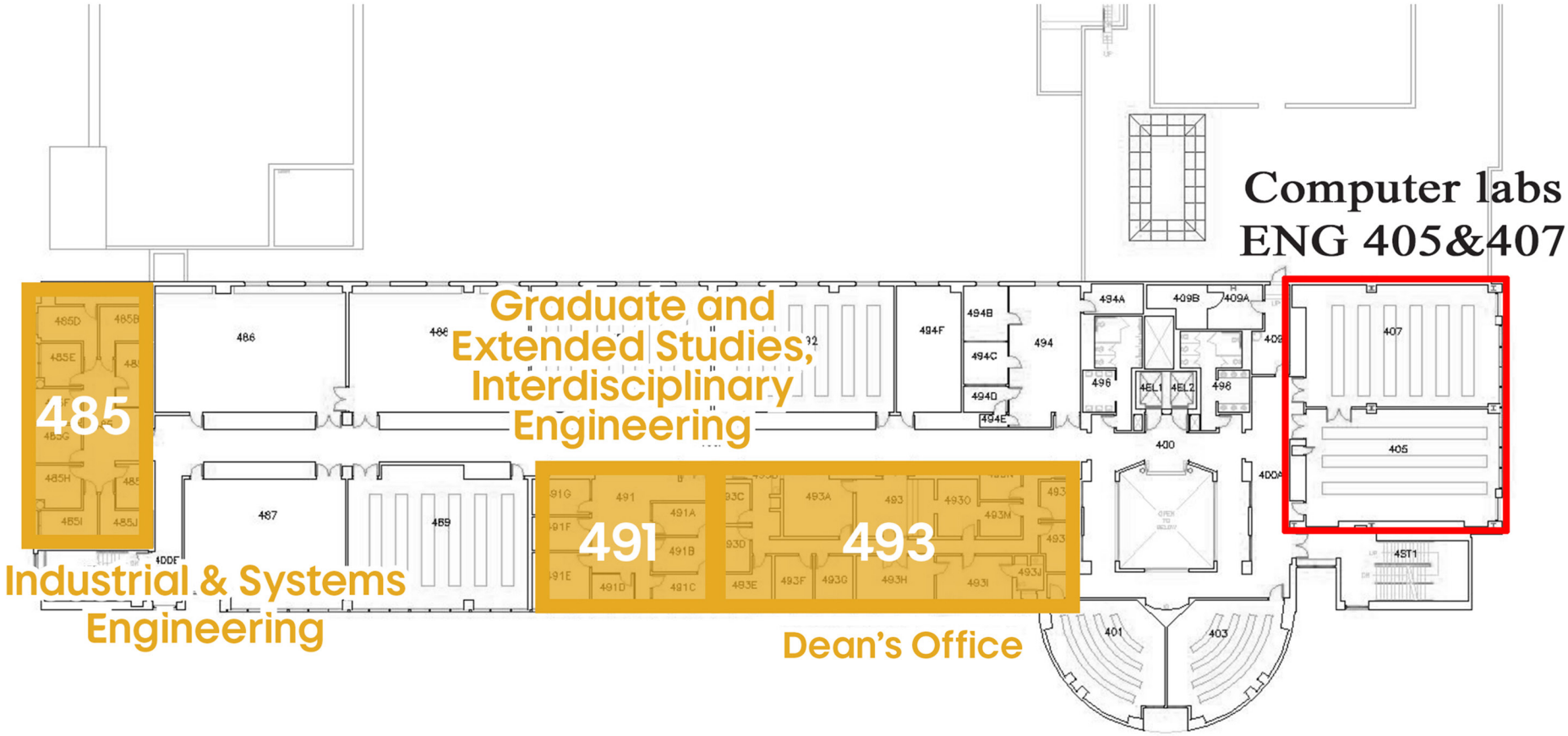
GROUND LEVEL

7. College of Professional and Global Education
8. Union Square Dining
9. Spartan Food Pantry
10. Information Center
11. Welcome Center
12. Chicanx/Latinx Student Success Center
13. Student Involvement
14. PRIDE Center
15. Gender Equity Center
16. Study Space
17. Black Leadership and Opportunity Center
18. César E. Chávez Community Action Center
19. Subway
20. Vacant Space
21. Veterans Resource Center
22. Spartan Bookstore
23. MOSAIC Cross-Cultural Center
24. IDEA Lab
25. Associated Students Transportation Solutions
26. Associated Students General Services Center

LOWER LEVEL

27. Bowling Center and Billiards Room
28. Starbucks
29. Starbucks Lounge
30. Student Union Theater

Engineering Building Fourth Floor



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