2018 AU AE Day in Huntsville

New Faculty Preview
Davide Guzzetti
Background

Ph.D. Aeronautics & Astronautics, Purdue University

M.S. Space Engineering, Politecnico di Milano

B.S. Aerospace Engineering, Politecnico di Milano
Fundamentals of Chaotic Dynamics in Space

Exploring chaotic regimes

- Ephemeris
- Irregular gravity, strong SRP
- Multi-body gravity
- ...

Developing theoretical and numerical tools for chaotic dynamics

- Dynamical systems theory
- Numerical correction algorithms
- Solution spaces mapping
- ...

Application to science and engineering

- Orbit and attitude motion of natural objects
- Computational spacecraft GNC
- Trajectory design
- Attitude dynamics and control
- ...

Mission Analysis and Flight Operations for Advanced Space Exploration

Destinations
- Cislunar space
- Libration points
- Asteroids
- Interplanetary

Architectures
- Deep space gateways
- Solar sails
- Fractionated systems
- Small satellites
- Remote sensing platforms

Credits for satellites and celestial bodies rendering: endurosat.com, nasa.gov
Past and Current Projects

- Solar sailing at binary asteroids
- Attitude dynamics in three-body problem
- Orbit maintenance for manned vehicle in cis-lunar space
- Human-inspired online trajectory planning
- Rapid trajectory design in Earth-Moon ephemeris
- Orbit maintenance for manned vehicle in cis-lunar space
- Attitude dynamics in three-body problem
- Solar sailing at binary asteroids

Credits also to E. Zimovan, W. Schlei, K. Howell
3i - Space Dynamics

The Auburn vision:  
*shaping the future of astrodynamics and space research*

**Immersive:** leveraging emerging technology for science and engineering data visualization

**Interactive:** developing intuitive frameworks for rapid mission analysis and flight simulation

**Intelligent:** human-inspired engineering and machine learning applied to space exploration