I. EXOSIMS – Exoplanet Open-Source Imaging Mission Simulator
- Performs ensembles of mission simulations to determine distributions of science yield
- Developed as part of WPS investigation
- Alpha release: February 2016
- Continued updates through 2017
- Community driven project
- For Interface Control Document and other documentation, visit: https://github.com/dsavransky/EXOSIMS

II. Simulation of a mission ensemble
- Filters out (from star catalog):
  - Binary stars,
  - Too long integration times,
  - Unreached completeness threshold,
  - Stars with planets within the IWA

  - IWA and OWA (bottom right) are calculated based on throughput, contrast, and off-axis PSF (here below) data from [2]

III. Modular architecture of EXOSIMS
- Independent specific input modules (red boxes) and simulation modules (blue boxes) written in Python
- Allows user to investigate multiple mission or system designs by only modifying modules with design changes
- Interface control document defines input/output specification for each module

IV. Example of completeness joint probability density function
- Based on planet’s apparent separation from star and difference in brightness (magnitude)
- Generated from specific probability density functions in the Planet Population module [1] such as semi-major axis, eccentricity, orbital orientation, geometric albedo, planetary radius and mass
- Updates completeness values for systems previously observed

V. Target List Module
- Filters out (from star catalog):
  - Binary stars,
  - Too long integration times,
  - Unreached completeness threshold,
  - Stars with planets within the IWA

  - IWA and OWA (bottom right) are calculated based on throughput, contrast, and off-axis PSF (here below) data from [2]

VI. Survey simulation
- Performs specific simulations on the created synthetic universe
- Calculates detection times using the method described by Kasdin and Braems in [3] to set false alarm and missed detection thresholds
- Calculates characterization times with the IFS [4], for each spectral band
- Returns mission timeline, and encodes final state of simulated universe
- Runs multiple survey simulations (Survey Ensemble module)

References