Characterizing the Population of Near Earth Asteroids to be Discovered in Year One of LSST Operations

Ed Lu - Asteroid Institute

Joachim Moeyens, Mario Juric, Siegfried Eggl - DIRAC Institute
Univ. of Washington

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LSST Will Discover ~9000 H<25 NEOs in Year 1

- 108 NEOs with Earth MOID < Lunar distance (~twice per week)
- 156 NEOs which at some point have orbits consistent with MOID < R_Earth
- ~25% of these take longer than 10 days to rule out MOID overlap with Earth

- Fast turnaround follow-up observations needed!
- Building cloud-based scalable astrodynamics platform (ADAM) for data analysis

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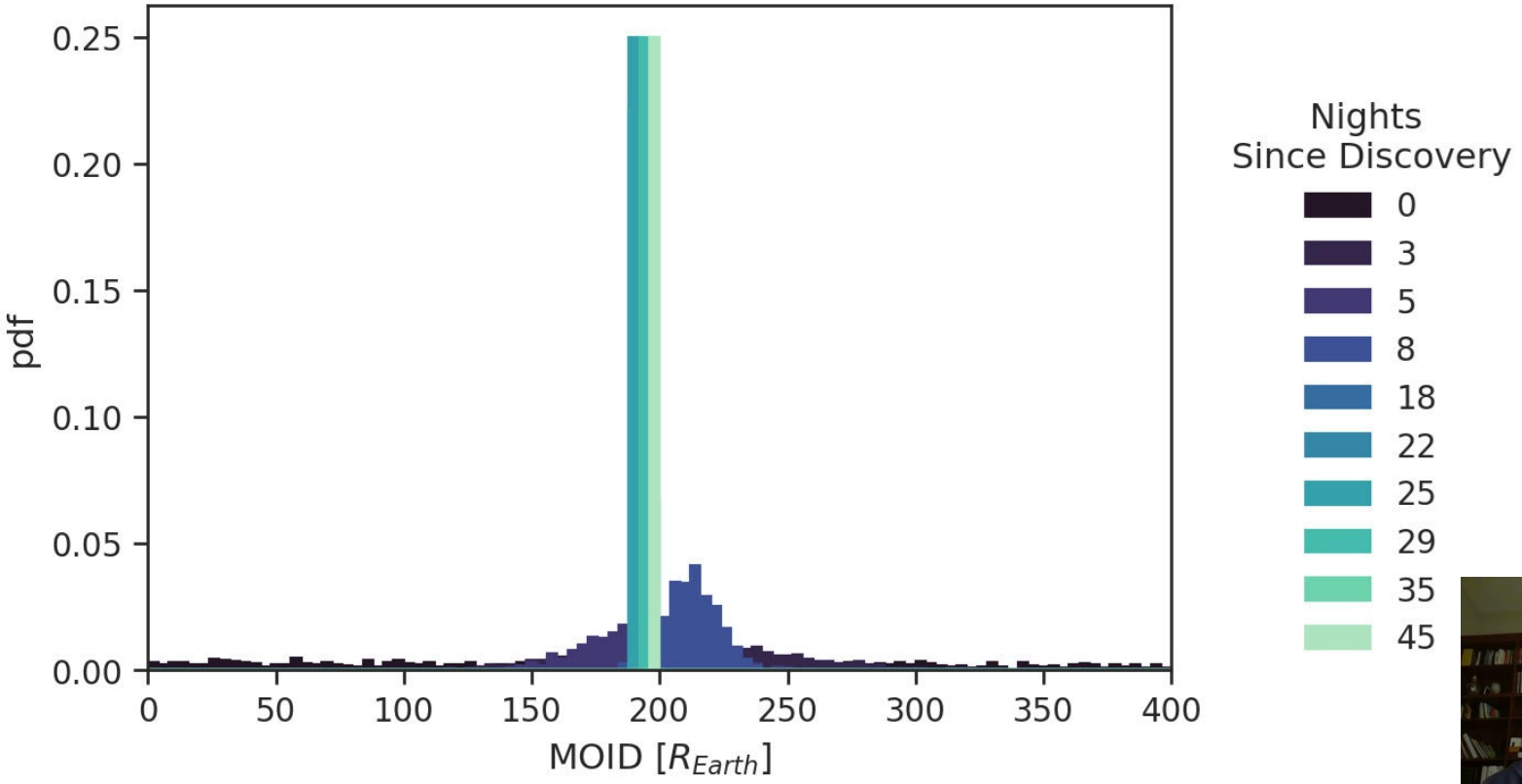
LSST First Year NEO Simulation Pipeline

Observations	SImulated observations of H<25 Granvik NEOs including trailing losses, detection losses. Generated using JPL *ObjectsInField* and LSST *Survey Simulator Post Processor*.
Linking	Idealized linker uses LSST discovery criterion 3 tracklets on 3 unique nights within 15 days.
Orbit Determination	IOD and OD uses Bill Gray's *FindOrb* for each subsequent night of observations after discovery.
Covariance Sampling	Variant orbits are selected from the Orbit Determination best fit and associated covariance matrices.
MOID Calculation	The MOID is calculated for each variant orbit on each night with observations.

MOID distribution evolution for one example asteroid



Many Objects Will Have MOID<R_Earth for Some Period of Time

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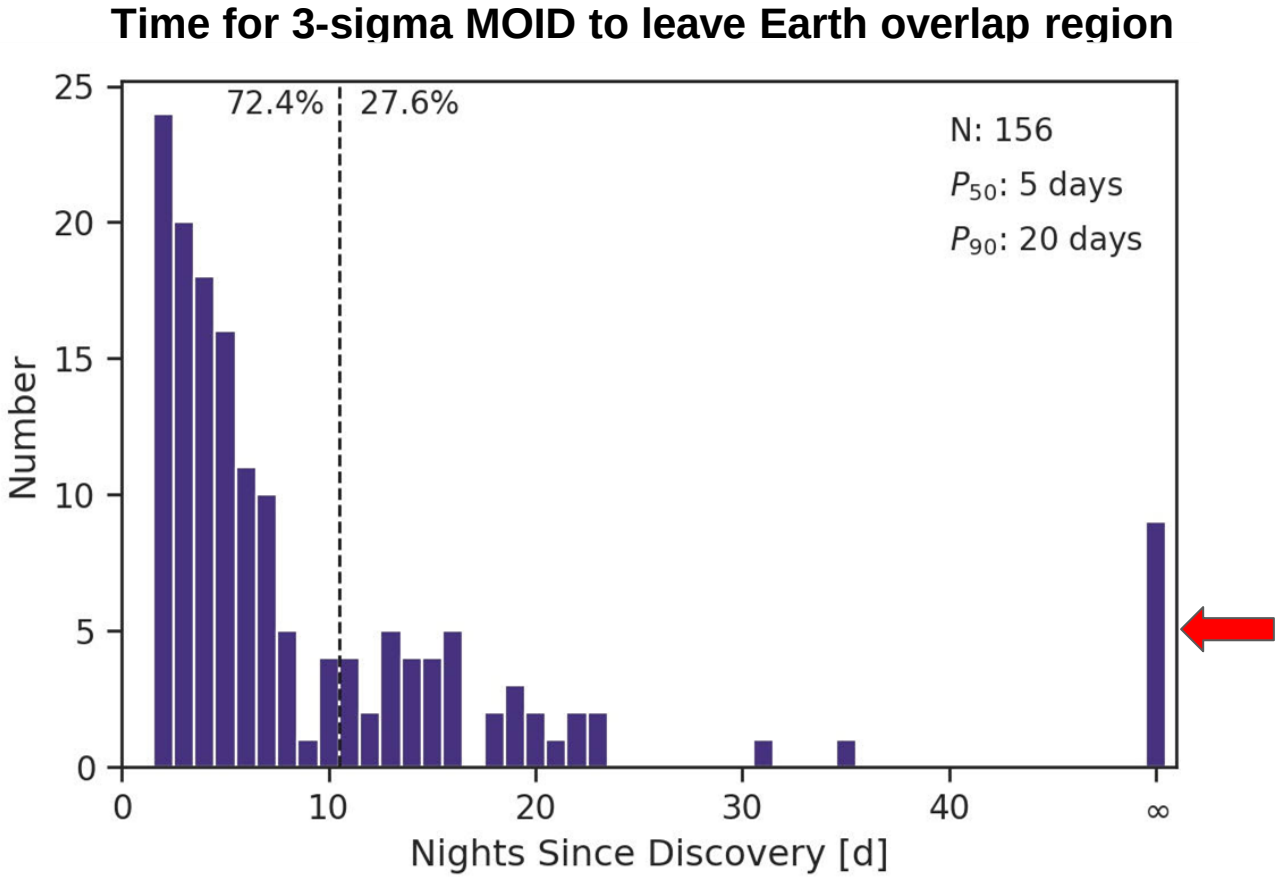

Follow-up observat

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