Imaging from IR to visible

John D. Monnier

U. Michigan

Outline

- Science Guidelines
  - Decadal panels: FP, magnetic fields, rotation, mass-loss, exoplanets/formation
  - New Topics: exoplanet host stars/kepler follow-up, asteroseismology
  - New facilities: ALMA, GAIA, JWST, <u>TESS, PLATO</u>, <u>LSST</u>, ELTs,…
  - Forge new links to mainstream

- Operational advantages of imaging
  - More data per night – needed for time-domain "snapshots"
  - Better data for calibration checks
  - "definitive science results" vs. "informative but ambiguous science"

- Multi-wavelength imaging VRIJHK – (+LM at VLTI)
  - Fringe tracking for sensitivity and spectroscopy
  - Multiwavelength view leads to richer science
  - Pursue J-P. Berger's concept of "I-Shooter"

- Sensitivity should not be forgotten

Astronet Science Priorities

- What is the origin and evolution of stars and planets
  - How do stars form ?
  - Do we understand stellar structure and evolution?
  - What is the life-cycle of the Interstellar Medium and Stars ?
  - How do planetary systems form and evolve ?
  - What is the diversity of planetary systems in the Galaxy?
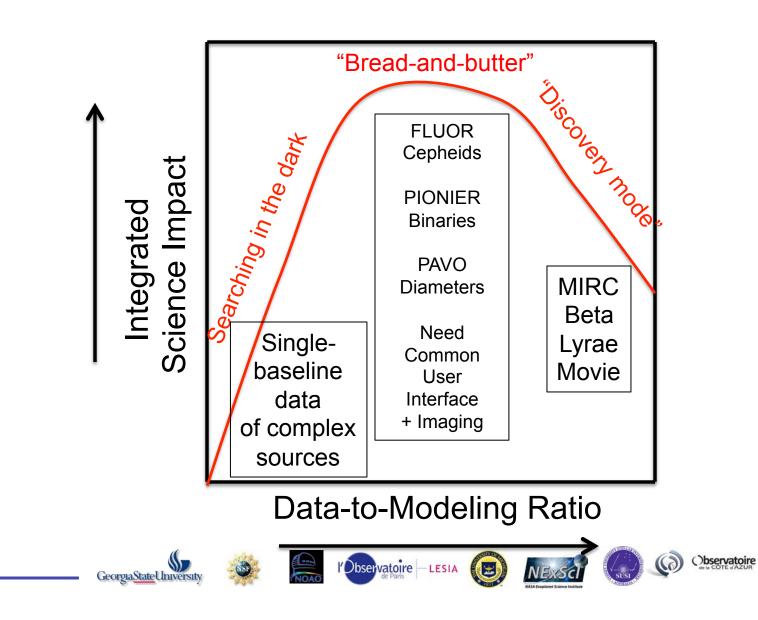 - Is there evidence for Life on exoplanets ?

Score: 6 out of 6

Path to align technical and scientific goals …

- We need GRAVITY, MIRCx, MYSTIC, MATISSE
  - key science: planet formation, galactic center
  - Focused well on mainstream topics, emphasizes imaging
  - ESO leverages the four 8-m class telescopes (UNIQUE!)
- Develop visible light imaging
  - key science: FP, asteroseismology, mass-loss, magnetic fields (TESS,PLATO)
  - Build sensitive visible light 6-beam combiner, spectro-interferometry
  - Push for new long baseline at CHARA
- Keep strong goal to improve sensitivity for imaging
  - CHARA-AO, better detectors like nuvu & Selex detectors
  - Until imagers improve their sensitivity, simple combiners needed still
- Community access to build user base
  - Enabled by *simpler* instruments, automatic data reduction
  - J-P Berger's concept of multiwavelength "I-Shooter"