A Bridge to the Stars

Innovative STEM Engagement Strategies to Improve Enrollment and Diversity in Kansas City

September 20, 2014

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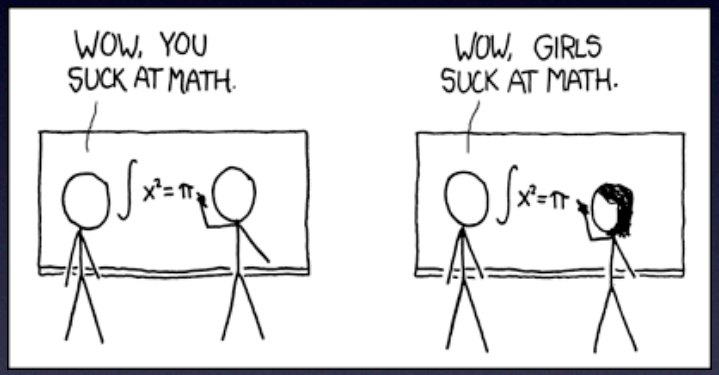
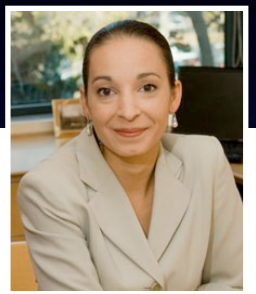
University of Missouri - Kansas City

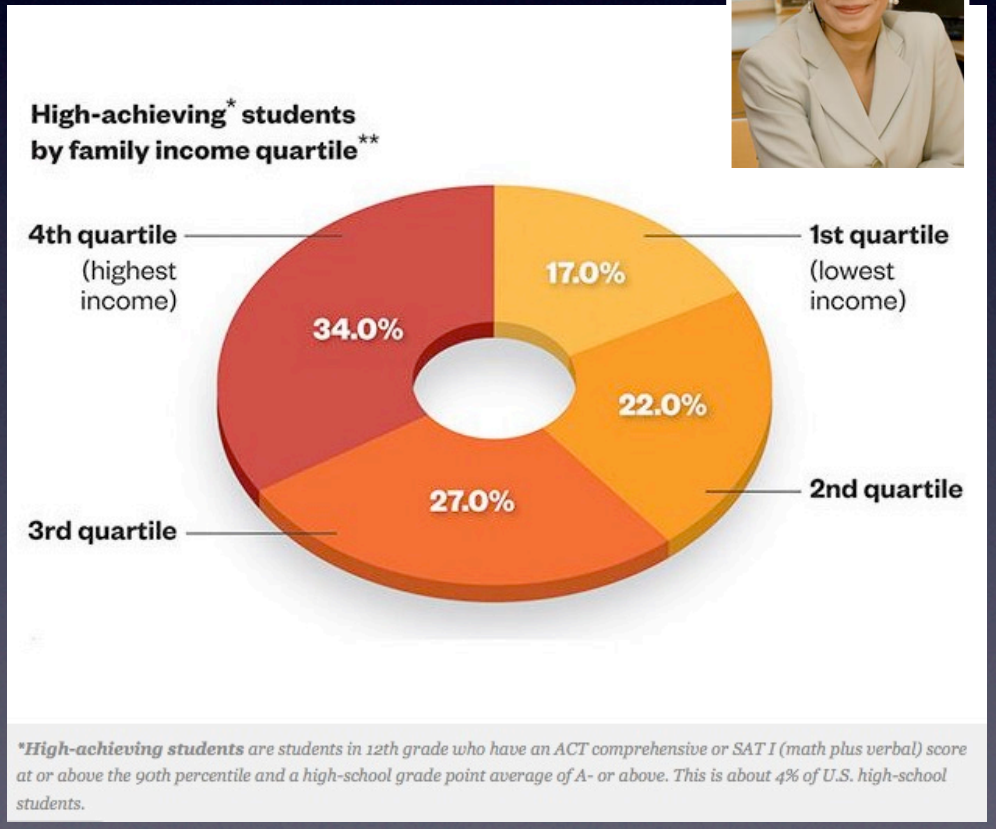
Recruiting Diverse STEM Majors

- Engaging/recruiting underrepresented & disadvantaged <u>high-school</u> students remains a critical problem in STEM.
  - an economics problem
  - a cultural problem



Caroline Hoxby
(Stanford U.)





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- Typical recruiting strategies target high-achieving, high-school & college students:
  - but cream of the crop from low-income demographic have socio-economic pressures to focus on more lucrative career tracks.
  - top achievement is not the only metric of potential success in STEM

The Pipeline: A Targeted Solution

A Bridge to the Stars: Astro 101 in a University Setting for Inner City High School Students

- Unique solution: an astronomy-based pipeline for urban H.S. students

opportunity

high-impact engagement

recruitment of key demographic

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depends on success
(UG Mentors)
+
roadmap
(Career counseling)

A Bridge to the Stars

- Highlights from first two years:

16 Bridge *Scholars* (75% female, 20% male) (80% AA, 10% HA) [17 scholarships]

Scholars Corey Smith and Diamond Wooten (Hogan Prep. Academy) in Spring 2013.

Scholars Michael Crisp (1), Elisha Verge (2), Amanda Woolley (1), Nataly Ulloa (1), Talia Lindsey (3) and Fatima Mohamed (1) in Spring 2014. (1) Lincoln Prep. Academy, (2) KCMSD South West Early College Campus, (3) Hogan Prep. Academy

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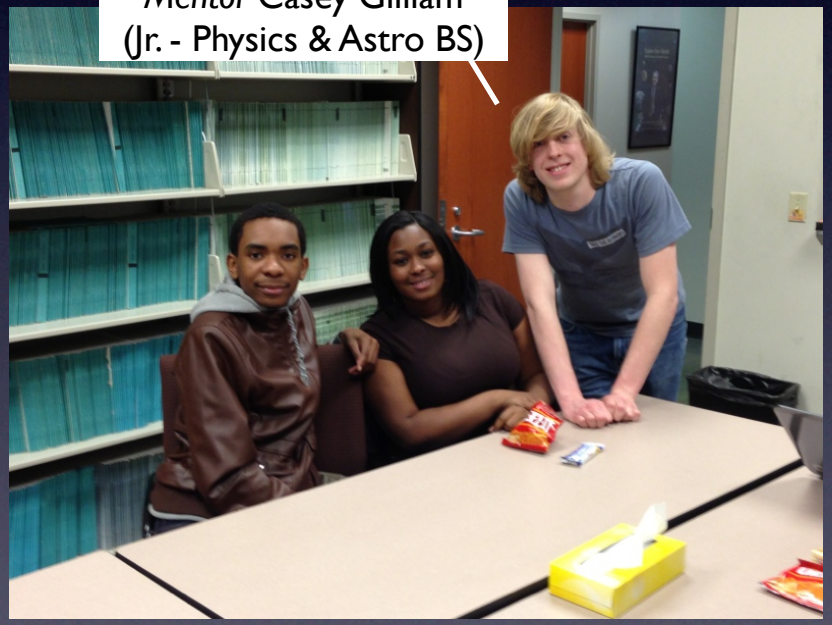
6 Bridge *Mentors* (50% female, 50% male) (*need diversity here*)



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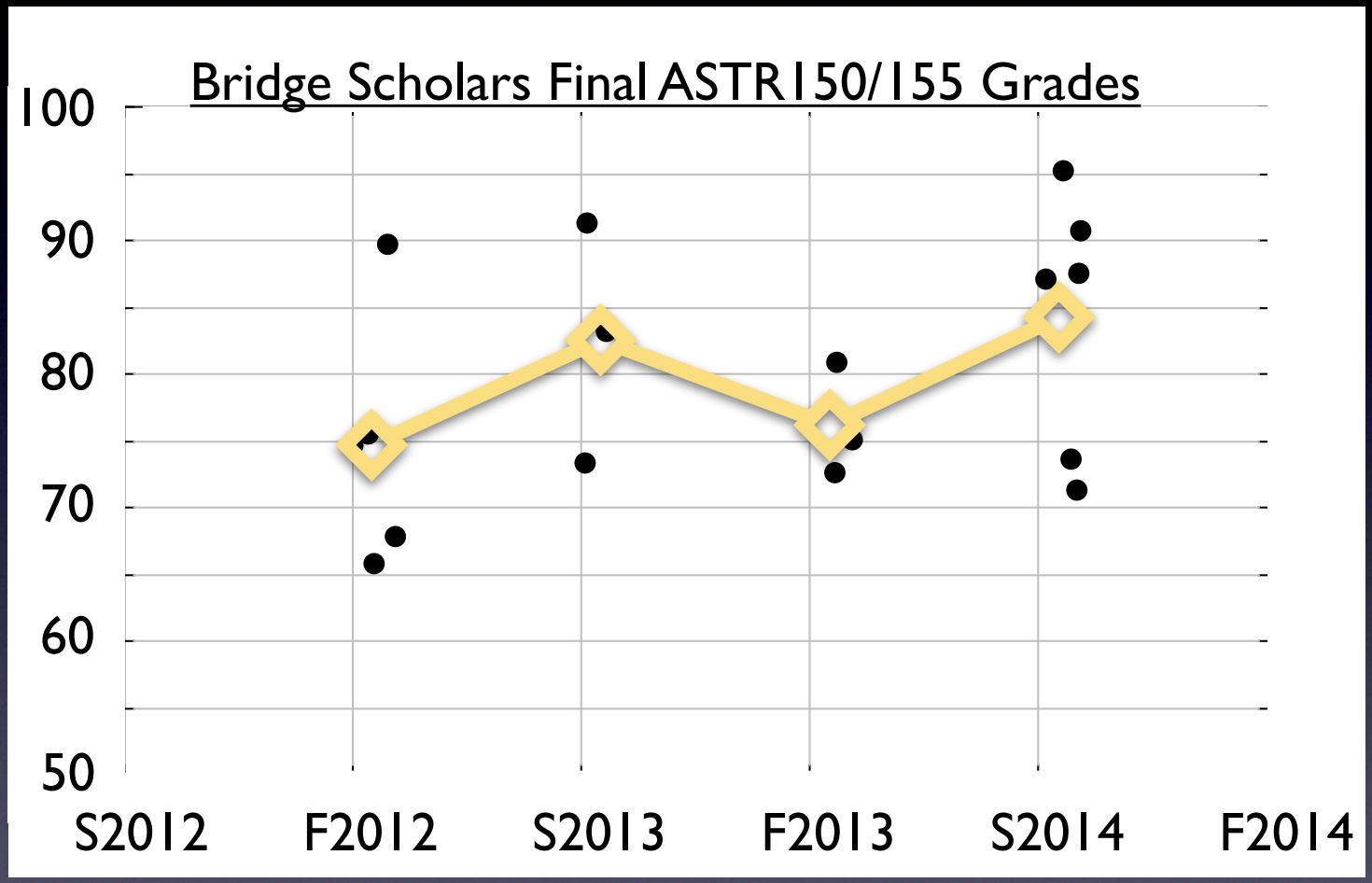
90% pass



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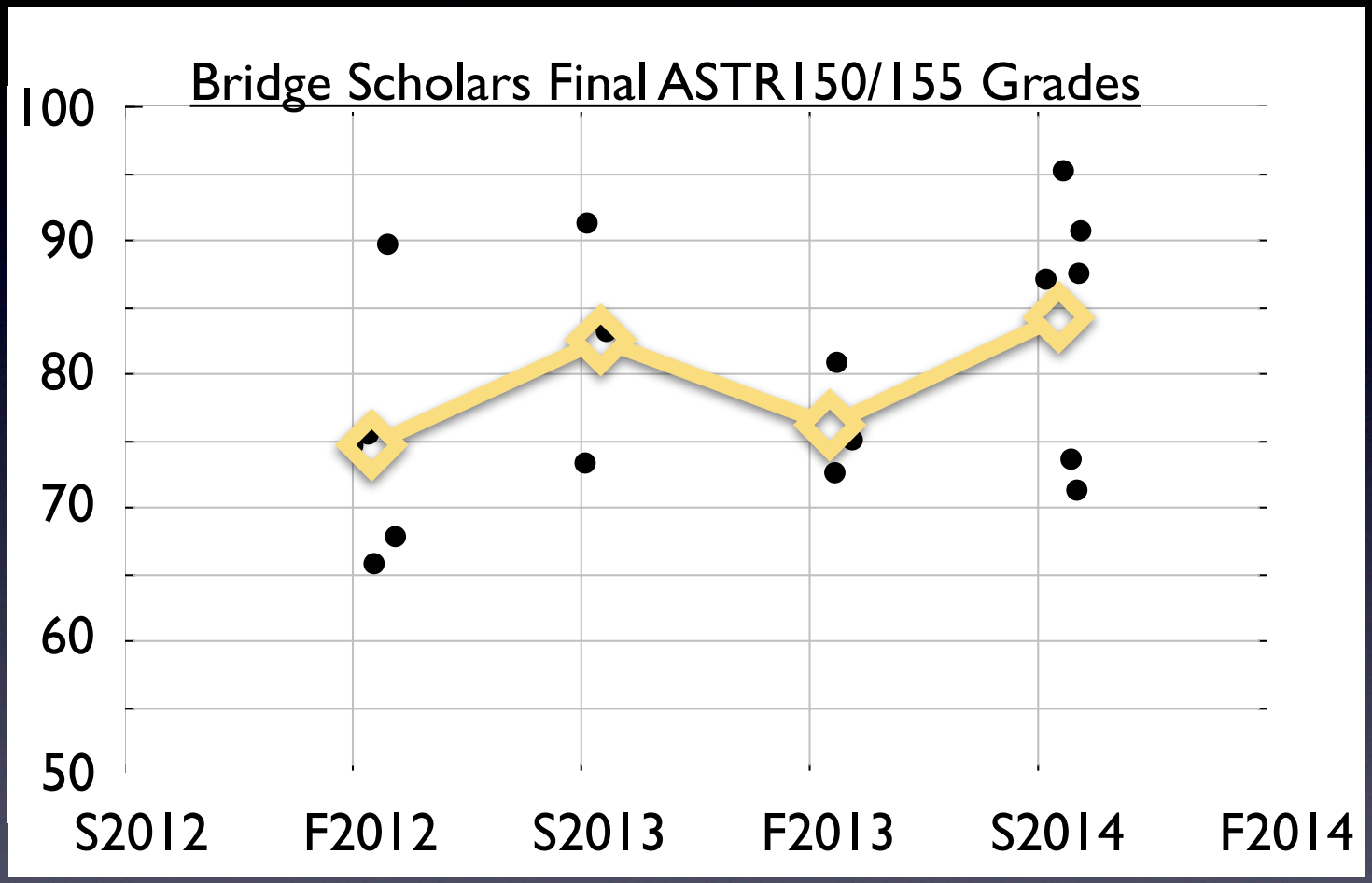

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**all with course grade >85%* ***all owing to ASTR course experience*

Lessons & Improvements

Application essay critical

success depends on
self-identified interest

Mentor screening

must have maturity
& desire to teach others

A Bridge to the Stars Scholarships (2014-2015)

A unique opportunity to take a UMKC Introduction to Astronomy course taught by a professional astronomer awaits you!

Receive university credit for a course that meets standard, general-education science requirements nationwide.

Choose from *one* of two interactive, student-centered explorations of the cosmos with Dr. McIntosh, an astronomer working at the forefront of research on the birth and growth of galaxies using the Hubble Space Telescope.

ASTR 150 *Introduction to Astronomy: Gravity & Motion in the Universe*
Fall: Tuesdays & Thursdays 4:00-5:15pm on the UMKC campus
ASTR 155 *Intro to Astronomy: Interaction of Light & Matter in the Universe*
Spring: Tuesdays & Thursdays 4:00-5:15pm on the UMKC campus

Eligibility: junior and senior high-school students in good academic standing with a real interest in astronomy and science (essay required).

Six scholarships are available for Fall 2014. Each covers tuition, fees, student Metro bus pass, and required course materials.

Application Deadline: Friday May 16, 2014 (5pm)

Application material and info - http://cas.umkc.edu/hscp/bridge-to-the-stars.asp

Made possible through funding by the NASA Missouri Space Grant.

A Bridge to the Stars Mentoring Internship Program at UMKC

Attention Astro155 students!

I am looking for motivated students to mentor a small group of urban high-school students who will be awarded scholarships to take Astro150 at UMKC this Fall (2014).

Earn $50/week and **free** enrollment in Astro150 to work with the scholarship students in class (*TPS, LT*, etc.) and meet with them outside of class 1-2 times weekly. Gain mentoring experience and a solid professional reference for your resume!

Accepting applications from current Astro155 students with a strong academic record. Not required to be a science major. Looking for students with a desire to help others succeed. Class meets Tu/Th 4:00-5:15pm. Weekly mentoring meetings TBD based on your schedule.

Application:
- Email a short (1-page) statement describing your interest in this opportunity.
- Please include contact information (email address is fine) for one reference.

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For questions contact: Prof. McIntosh (mcintoshdh@umkc.edu)

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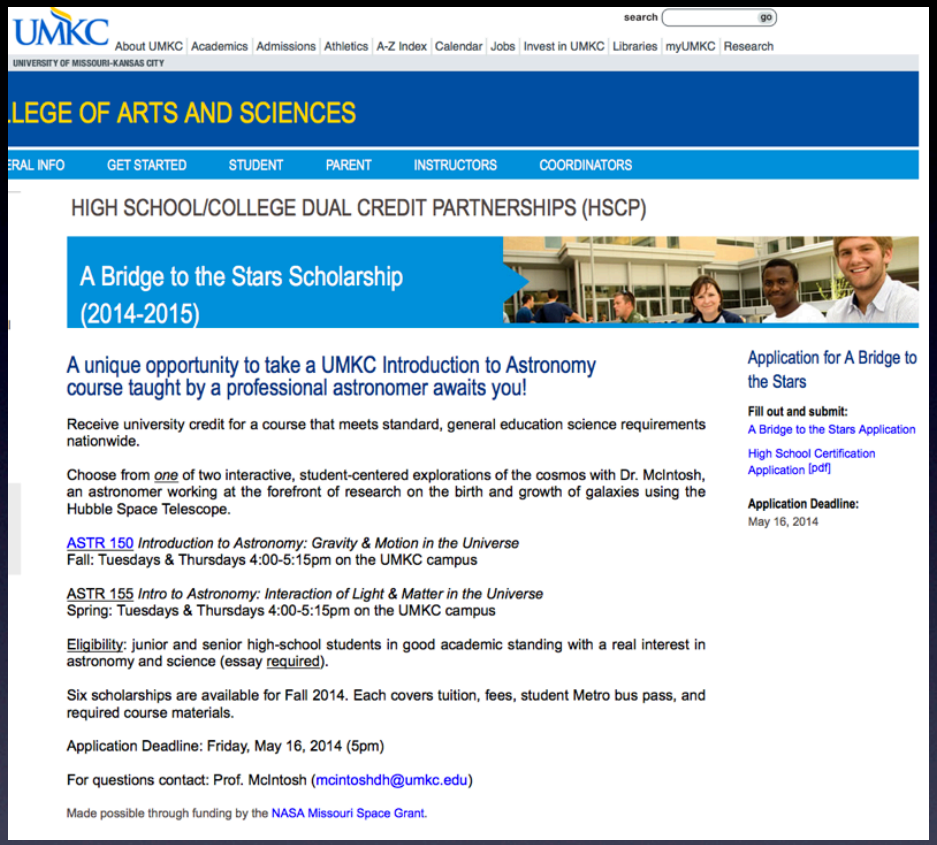
Lessons & Improvements

- Building an effective *Bridge Network*

  Partnerships established with:

  KC Public Schools
  KC STEM Alliance
  PREP-KC
  Science Pioneers
  UMKC High School College Partnerships
  UMKC Institute for Human Development

  plus counsellors/administrators at
  Hogan Prep. Academy
  KCMSD South West Early College Campus
  Lincoln Prep. Academy



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HIGH SCHOOL/COLLEGE DUAL CREDIT PARTNERSHIPS (HSCP)

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Application for A Bridge to the Stars

Fill out and submit:
A Bridge to the Stars Application
High School Certification Application [pdf]

Application Deadline:
May 16, 2014

- Critical for promoting even an exciting opportunity, need to build relationships with city high-school S&M teachers to increase candidate pool.

A Bridge to the Stars (2.0)

- Expand pipeline to a 3-tier Bridge to the Stars:

A Bridge to the Stars (1.0)	→	former *Scholars* enrolled at UMKC mentor next Bridge *Scholars*	→	former *Mentors* receive scholarships for research skills training course*
Scholarship		*Mentoring Internship*		*Research Training*

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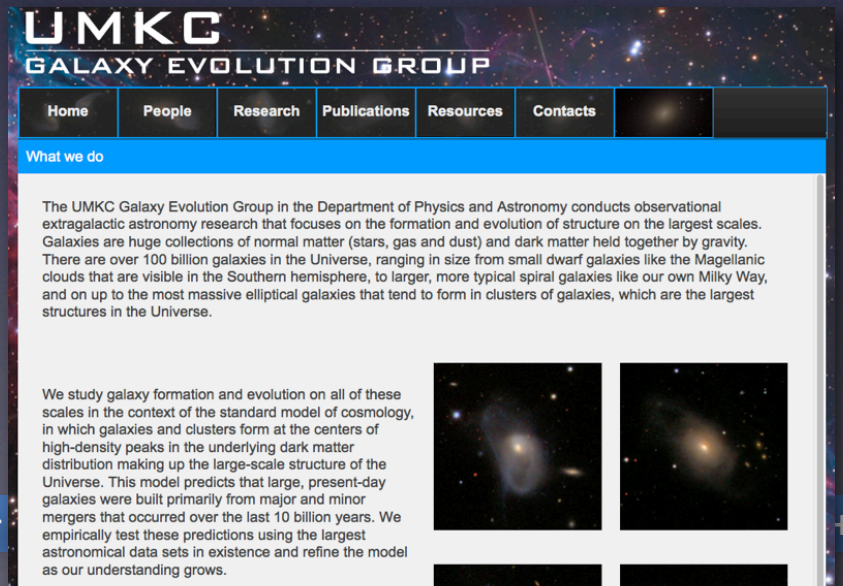
Scholarship

Mentoring Internship

Research Training

**100% of successful students have joined the Galaxy Evolution Group and received internships.*



Research Training with Limited Resources

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- Adaptable: classroom, group or laboratory setting
- Effective use of small F&S $ for engagement/recruitment of underrepresented groups

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Important for Astro (big data) research where shadowing is less effective/engaging.

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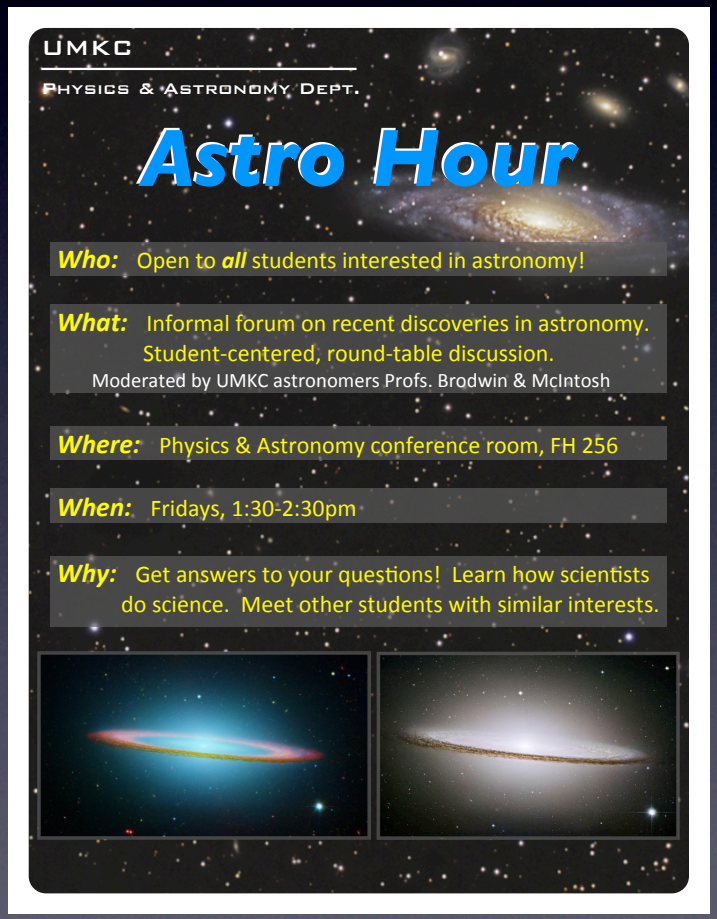

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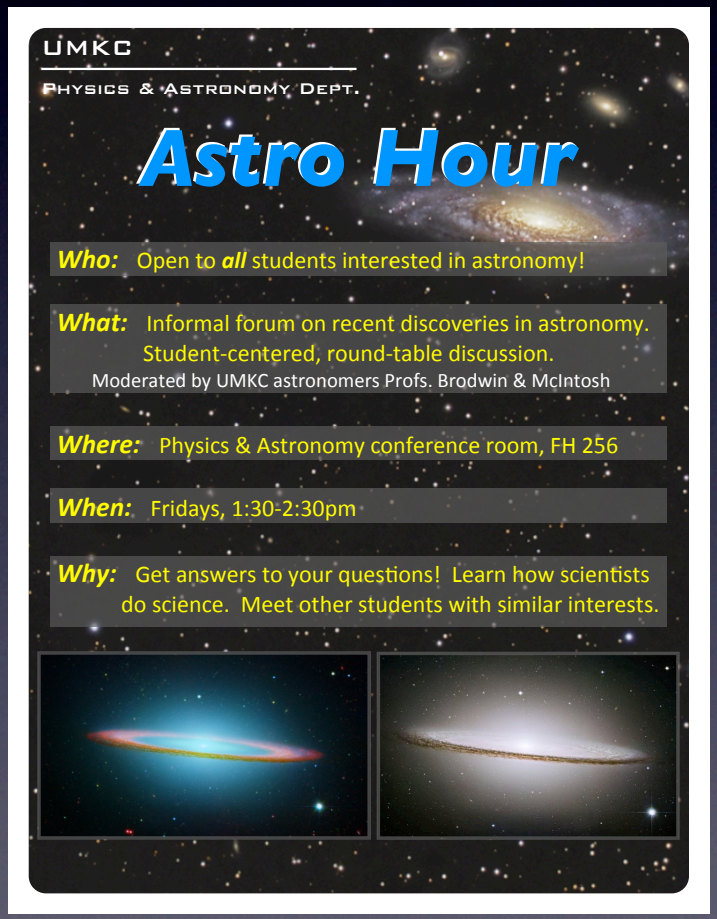
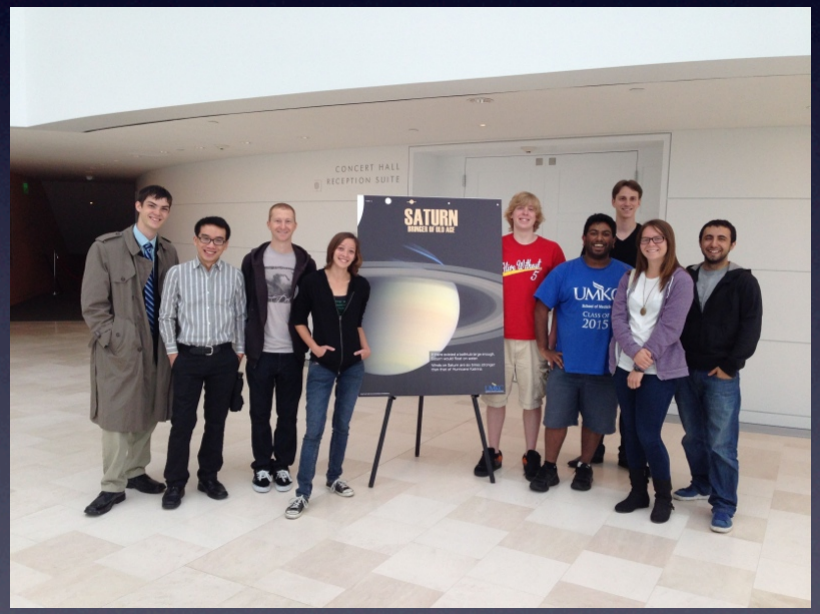


and creative EPO opportunities.

Sep. 2013: Holst Concert - *over 400 visitors!*



Students from Astro Hour designed and hosted EPO posters at Kauffman Performing Arts Center event.

A Closing Question

- Current political & economic climate is challenging for STEM:
  - tension between call for STEM recruitment and decreasing STEM funding

- Question: How do we engage/educate the public effectively about the cost vs. benefit of STEM research in general, and NASA missions in particular, without being boring and coming off as self-serving?

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- What's missing is a clear & entertaining way to help the public connect the dots between the great stuff we do, it's very low relative cost, and its huge impact (historically) on the US economy.