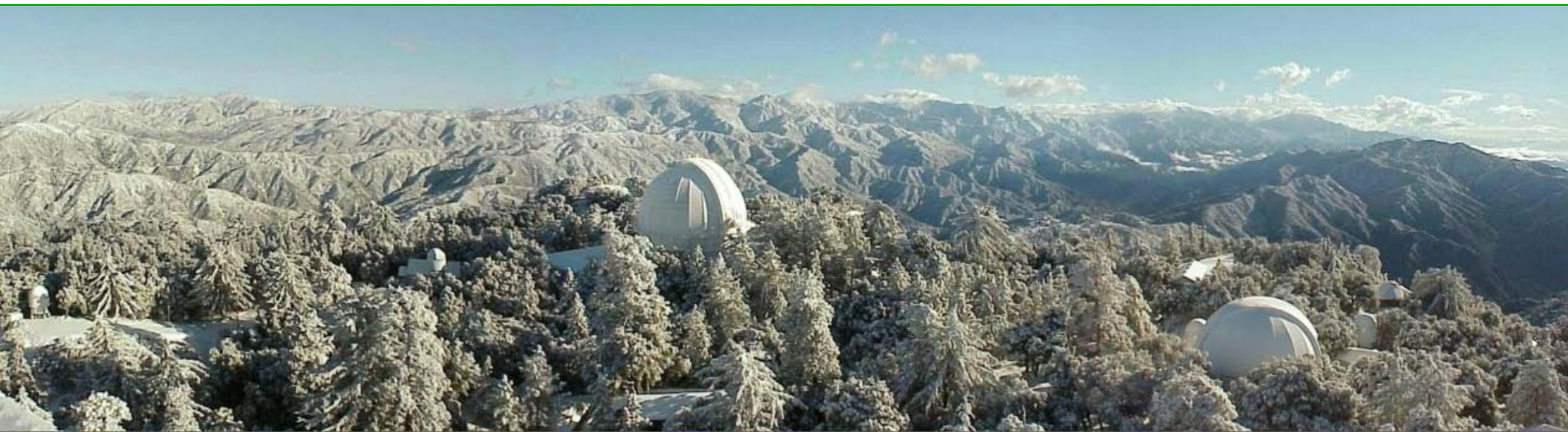


# CHARA Collaboration Year Seven Science Review



*Welcome to Atlanta*



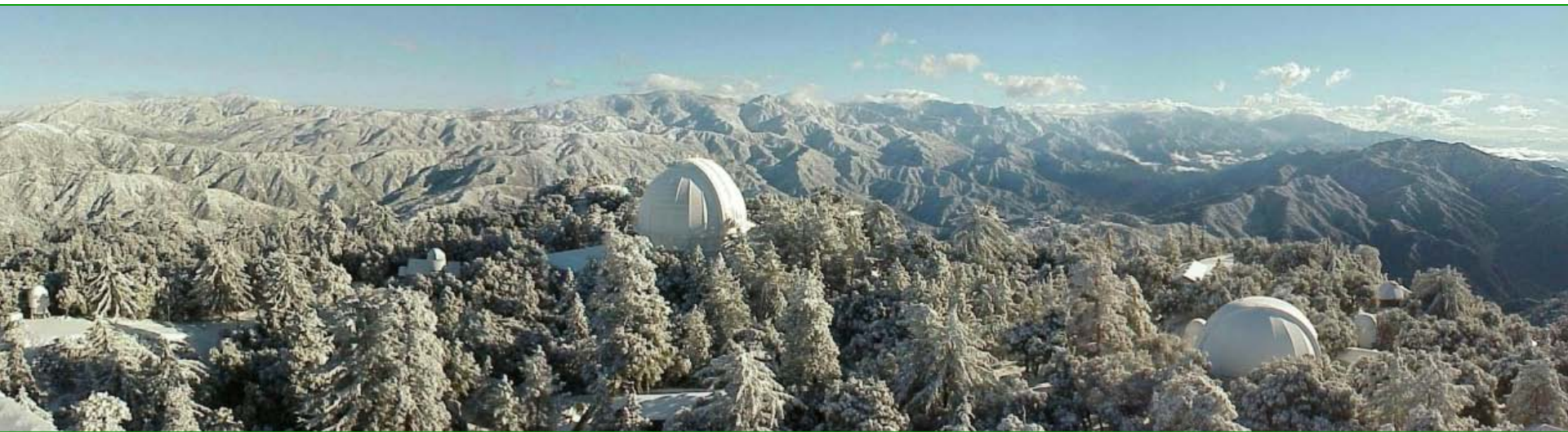
# Some Introductory Comments



*H.A. McAlister*

*February 28, 2011*

*CHARA Collaboration Year Seven Science Review  
Atlanta, Georgia*





# Refereed Papers from the CHARA Array

*Starting from Paper #1 in July 2005*

32. Imaging with the CHARA Interferometer. F. Pedretti et al., *Astronomical Journal*, 134, 1000, 2007.

15. A Near-Infra-Red Interferometric Study of the Stars I. Probing the Hot Dust Atmosphere of the CHARA Array. T. S. Bevan et al., *Journal of Astrophysics and Astronomical Observations*, 2009.

33. Angular Diameter of 52 CrB as Measured with CHARA. J. S. Baines et al., *Astronomical Journal*, 134, 1000, 2007.

39. The Hot Dust Atmosphere of the CHARA Array. T. S. Bevan et al., *Journal of Astrophysics and Astronomical Observations*, 2009.

9. CHARA Array from the CHARA Array. J. S. Baines et al., *Astronomical Journal*, 134, 1000, 2007.

27. Dust in the Astrophysical Disks of A Stars. R. J. Akeson et al., *The Astrophysical Journal*, 691, 1896, 2009.

16. VEGA: Visible Spectrograph and Polarimeter for the CHARA Array. J. S. Baines et al., *Astronomical Journal*, 134, 1000, 2007.

40. CHARA Array Observations of the Stars I. Probing the Hot Dust Atmosphere of the CHARA Array. T. S. Bevan et al., *Journal of Astrophysics and Astronomical Observations*, 2009.

10. CHARA Array Observations of the Stars I. Probing the Hot Dust Atmosphere of the CHARA Array. T. S. Bevan et al., *Journal of Astrophysics and Astronomical Observations*, 2009.

4. First Results from the CHARA Array. J. S. Baines et al., *Astronomical Journal*, 134, 1000, 2007.

Velocity and Rotational Velocity of the Stars I. Probing the Hot Dust Atmosphere of the CHARA Array. T. S. Bevan et al., *Journal of Astrophysics and Astronomical Observations*, 2009.

35. The Radius and Effective Temperature of the Binary A star  $\beta$  CrB. J. S. Baines et al., *Astronomical Journal*, 134, 1000, 2007.

17. CHARA Array Observations of the Stars I. Probing the Hot Dust Atmosphere of the CHARA Array. T. S. Bevan et al., *Journal of Astrophysics and Astronomical Observations*, 2009.

23. A First Look at the CHARA Array. J. S. Baines et al., *Astronomical Journal*, 134, 1000, 2007.

CONFERENCE: CHARA Array Observations of the Stars I. Probing the Hot Dust Atmosphere of the CHARA Array. T. S. Bevan et al., *Journal of Astrophysics and Astronomical Observations*, 2009.

The Astrophysical Journal, 689, 513, 2008.

36. Infrared Interferometric Study of the Stars I. Probing the Hot Dust Atmosphere of the CHARA Array. T. S. Bevan et al., *Journal of Astrophysics and Astronomical Observations*, 2009.

14. The CHARA Array. J. S. Baines et al., *Astronomical Journal*, 134, 1000, 2007.

24. The CHARA Array. J. S. Baines et al., *Astronomical Journal*, 134, 1000, 2007.

30. Asteroseismology of the Red Giant Star  $\epsilon$  Ori. J. S. Baines et al., *Astronomical Journal*, 134, 1000, 2007.

A. Mazumdar et al., *Astronomical Journal*, 134, 1000, 2007.

**50 Papers!**  
**Or, as Theo likes to point out,**  
**We're down to only**  
**\$380K per paper**

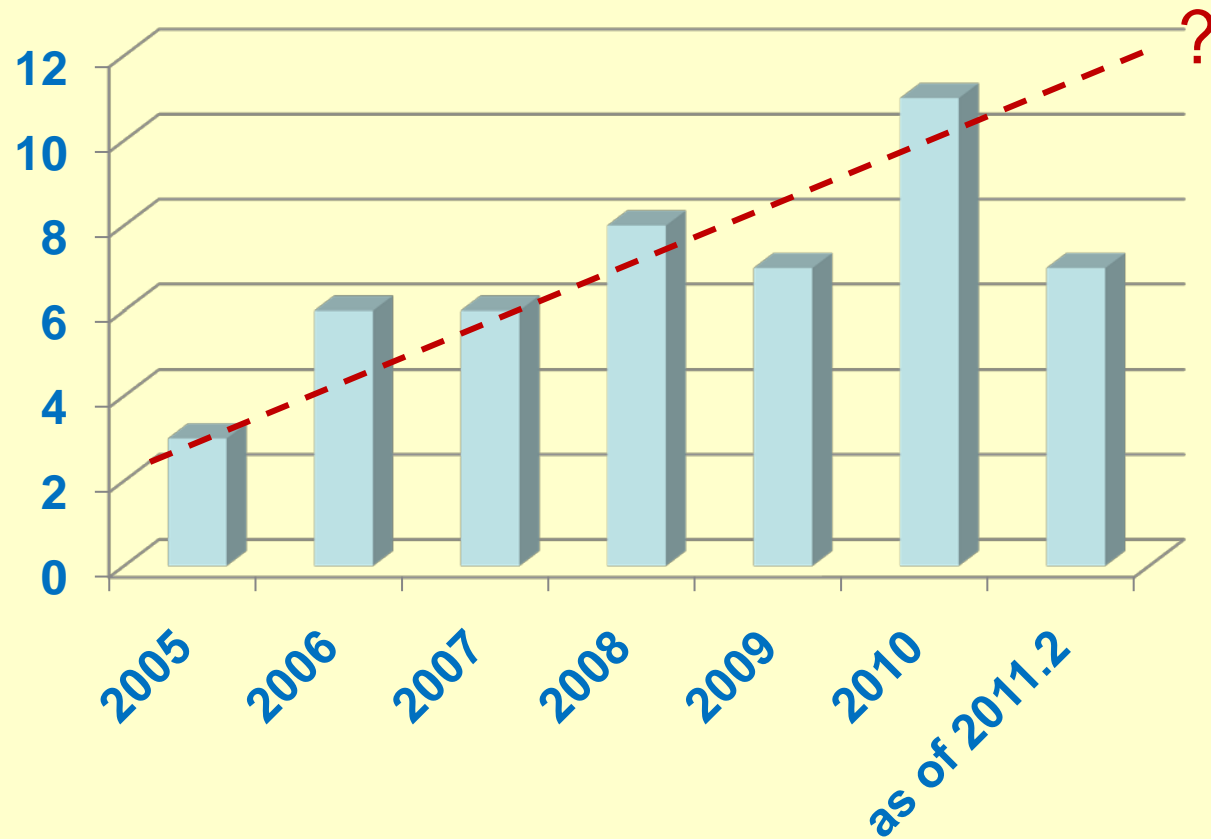
# Refereed Papers – A Friendly Comparison

Project	Interval	# Papers	Papers/yr
IOTA	1995.1 – 2008.5	52	3.9
NPOI	1997.8 – 2006.3	21	2.5
PTI	1998.8 – 2011.0	56	4.6*
KI	2003.7 – 2011.0	35	4.8*
VLTI	2004.0 – 2011.0	175	25.0!
CHARA	2005.5 – 2011.2	50	8.8

*Should we be doing better?*

\*biased

# CHARA Publication Rates



# Observing Schedule History

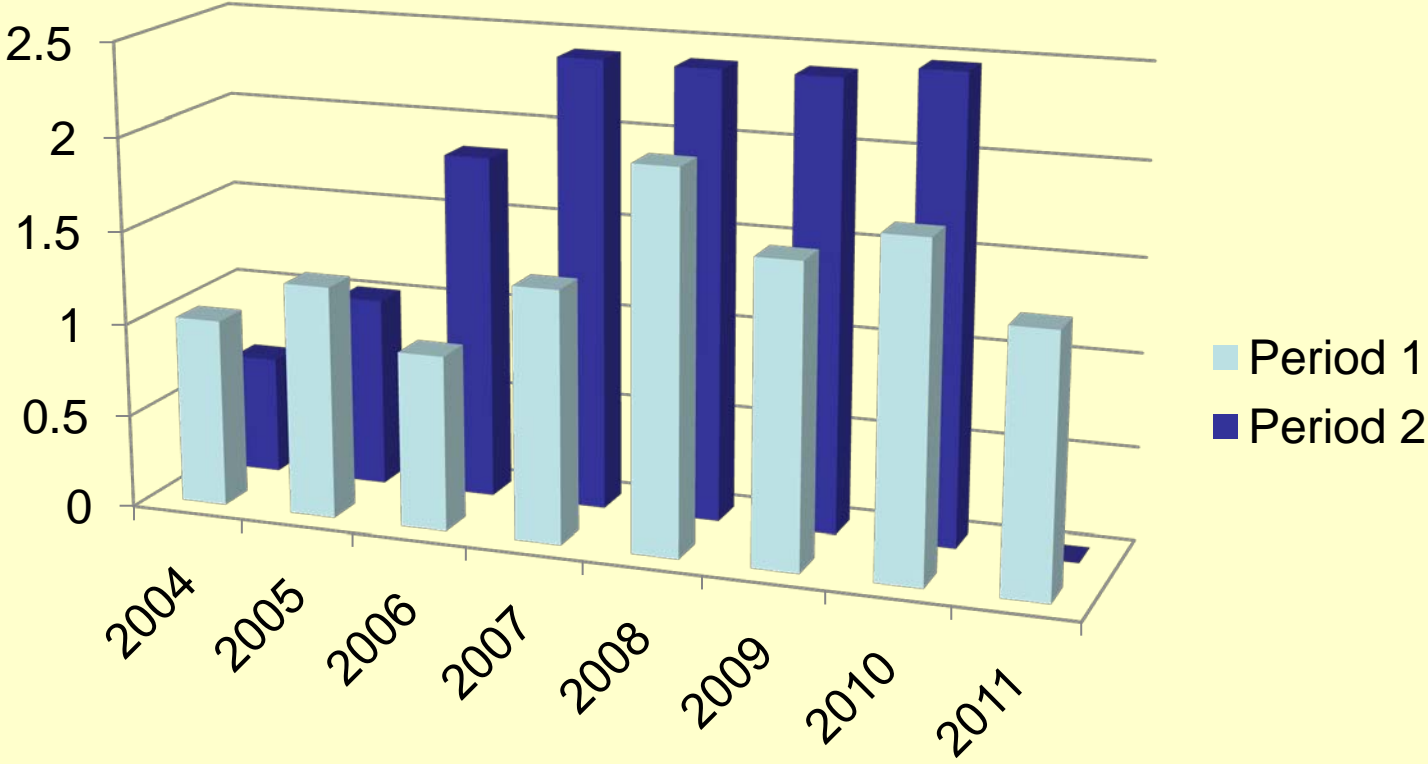
Period	# Prop.	Nights Requested	Nights Available	Ratio	Instruments
2004-1	13	158	157	1.01	CC-FL
2004-2	10	~70	112	0.63	CC-FL
2005-1	22	218	175	1.25	CC-FL-MI <sup>1</sup>
2005-2	12	85	83	1.02	CC-FL
2006-1	25	195	208	0.94	CC-FL-MI
2006-2	23	148	80	1.85	CC-FL-MI
2007-1 <sup>2</sup>	22	205	152	1.35	CC-FL-MI
2007-2	26	272	113	2.41	CC-FL-MI-VE <sup>1</sup>
2008-1	29	323	159	2.03	CC-FL-MI-VE-PA <sup>1</sup>
2008-2	32	252	105	2.40	CC-FL-MI-VE-PA
2009-1	47	246	153	1.61	CC-FL-MI-VE-PA-CL <sup>1</sup>
2009-2	34	266	111	2.40	CC-FL-MI-VE-PA-CL <sup>1</sup>
2010-1 <sup>3</sup>	34	272	153	1.78	CC-FL-MI-VE-PA-CL
2010-2	34	267	108	2.47	CC-FL-MI-VE-PA-CL
2011-1	28	212	153	1.38	CC-FL-MI <sup>1</sup> -VE-PA-CL-CH <sup>1</sup>

<sup>1</sup> Initial engineering or commissioning run

<sup>2</sup> Initiation of dual beam combiner scheduling

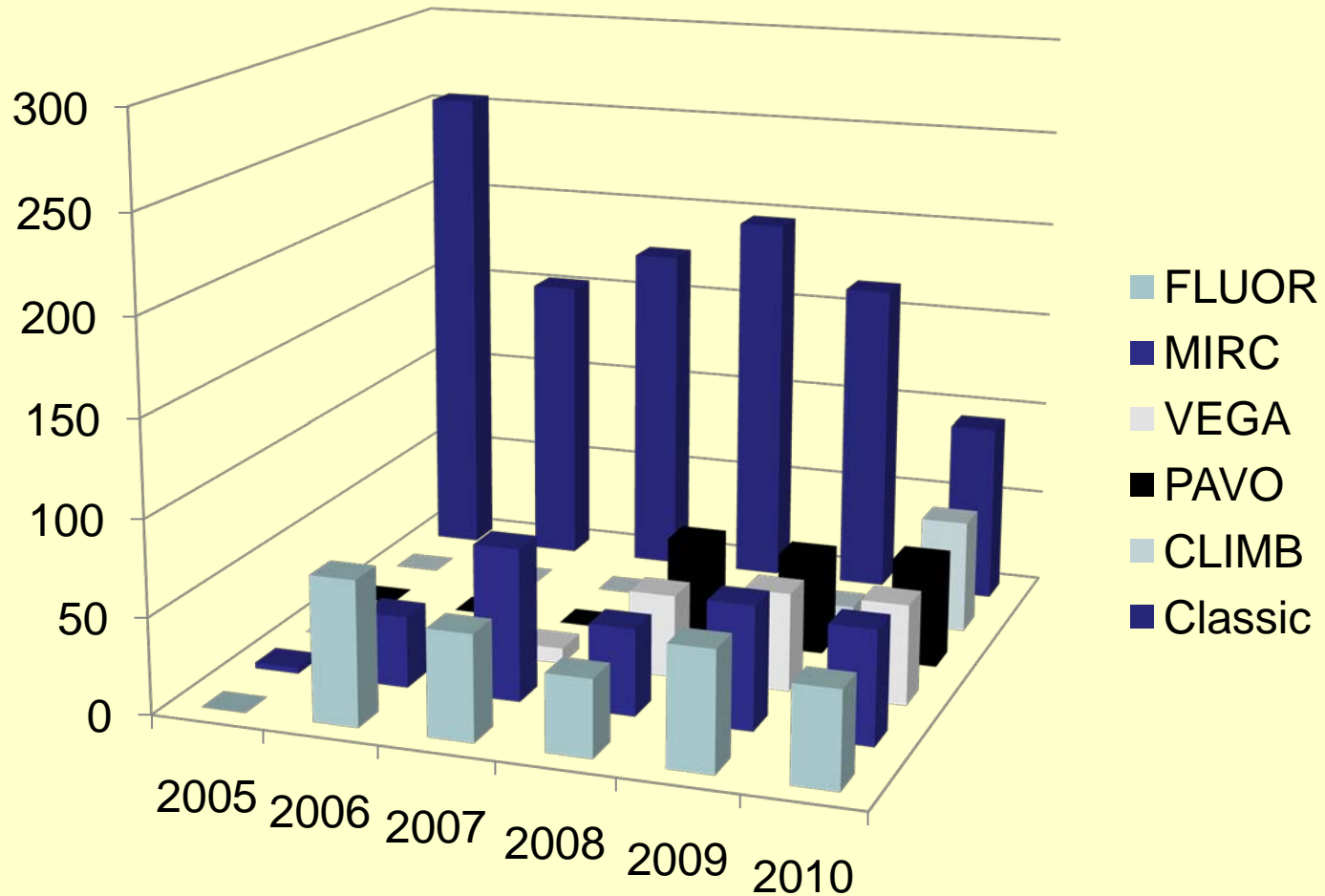
<sup>3</sup> NOAO access begun

# CHARA Subscription Values





# Beam Combiner Usage



# CHARA Array Capital Costs

## CHARA Array Capital Funding

### GSU/State Funding:

ETACT (Ga. Lottery)	\$5,373,000
COAS (FY 95-03)	\$859,932
GSURF (Kapteyn Renov.)	\$33,100
CIF/RPE	\$41,158
GSU Contingency	\$100,000
<b>Subtotal</b>	<b>\$6,407,190</b>

### NSF Funding:

Feasibility/Preliminary Design	\$746,600
Construction Funding	\$6,248,015
Overhead Return	\$44,124
<b>Subtotal</b>	<b>\$7,038,739</b>

### Private Funding:

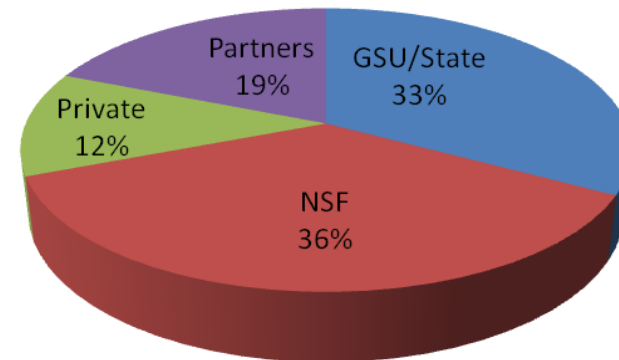
W.M. Keck Foundation	\$1,663,093
Packard Foundation	\$615,289
Kelly Gift	\$40,000
Arrington Gift	\$10,000
<b>Subtotal</b>	<b>\$2,328,382</b>

### Subsequent Value Added:

Paris Obs. FLUOR Combiner	\$400,000
Nice Obs. VEGA Combiner	\$1,500,000
U.Mich MIRC Combiner	\$1,500,000
U.Sydney PAVO Combiner	\$280,000
<b>Subtotal</b>	<b>\$3,680,000</b>

**Total Capital Cost: \$19,454,311**

## CHARA Array Capital Costs



**A commercial/technical appraisal following the 2009 Station Fire assigned a replacement cost of \$34M.**

# CHARA Operational Funding

## CHARA FY 2011 Operational Funding

### College of Arts & Sciences:

Personnel Support	\$401,705
Supplies & Travel	\$116,477
<b>Subtotal</b>	<b>\$518,182</b>

### H.A. McAlister as PI:

NSF Personnel Support	\$286,429
NASA STScI Hubble Fellow (Boyajian)	\$105,928
NASA ExScI Ops. Support (Farrington)	\$50,500
MWI Operating Agreement	\$12,645
Keck Foundation	\$32,500
Indirect Cost Returns	\$40,860
<b>Subtotal</b>	<b>\$528,862</b>

### D.R. Gies as PI:

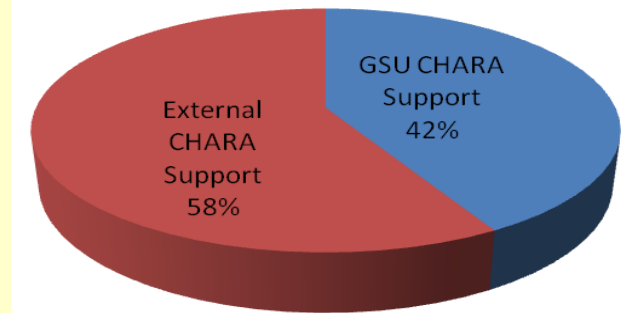
NSF Post Doc (Schaefer)	\$110,700
NASA/GIT Space Grant (Touhami)	\$14,000
NASA/MSC GRA (Richardson)	\$10,000
<b>Subtotal</b>	<b>\$134,700</b>

### R.J. White as PI:

NSF A Star Research	\$55,000
<b>Subtotal</b>	<b>\$55,000</b>

**Total FY 2011 CHARA Funding**                      **\$1,236,744**

**FY 2011 CHARA Support**



*CHARA Research Sponsored  
by*

**National Science Foundation  
GSU College of Arts & Sciences  
plus resources obtained  
by the  
CHARA Collaboration Members**



*Here's to a productive  
2011!*

