

**Supplementary Material for**  
***Leadership and Participation in NASA's***  
***Astrophysics Explorer-Class Missions***

***Astro2020 State of the Profession Considerations White Paper***

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This is supplementary material in support of the Astro2020 State of the Profession Considerations White Paper *Leadership and Participation in NASA's Astrophysics Explorer-Class Missions*.

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**Table S-1.** *Astrophysics Explorer-class Missions 2008–2016*

AO Category	Year	PI-Managed Mission Cost Cap
SMEX	2008	\$105M, not including Expendable Launch Vehicle (ELV) (FY08 \$)
MO	2008	\$70M (FY08 \$)
EX	2011	\$200M, not including ELV (FY11 \$)
MO	2011	\$55M (FY11 \$)
MO	2012	\$60M; \$30 M for balloons excluding launch (FY13 \$)
SMEX	2014	\$125M not including ELV, or \$175M with PI-provided access to space (FY15 \$)
MO	2014	\$65M; \$35M for suborbital class, including CubeSats (FY15 \$)
MIDEX	2016	\$250M, not including ELV (FY17 \$)
MO	2016	\$70M; \$35M for suborbital class, including CubeSats (FY17 \$)

**Table S-2.** *Submitted Astrophysics Ex/MO proposals 2008 – 2016, shown with PI gender. This data is displayed in graphical form in Figure 1 in the white paper [1].*

Opportunity	Number of Proposals		Total number of Proposals
	F PI	M PI	
2008 MO	1	10	11
2008 SMEX	1	17	18
2011 EX	0	15	15
2011 MO	1	10	11
2012 MO	1	8	9
2014 MO	0	7	7
2014 SMEX	0	13	13
2016 MIDEX	0	9	9
2016 MO	0	9	9
<b>Grand Total</b>	<b>4</b>	<b>98</b>	<b>102</b>

**Table S-3.** Number and gender of PIs for submitted Astrophysics Ex/MO proposals 2008–2016

	Total PIs	Unique PIs
Female	4	3
Male	98	58
<b>Total</b>	<b>102</b>	<b>61</b>

**Table S-4.** Science team size for Ex/MO proposals

Proposal Type	# Sci Team Members			
	Min	Max	Median	Mean
MO	6	42	15	17
SMEX	9	45	22	23
MIDEX (includes EX)	11	77	22	26

**Table S-5.** Submitted and selected proposals in three Astrophysics ROSES elements, shown by PI gender. This data was compiled by D. Evans. Some of this data is displayed graphically in **Figure 7** in the white paper [1].

ROSES Element	Submitted Proposals			Selected Proposals		
	Total	% M PI	% F PI	Total	% M PI	% F PI
<b>ADAP</b> 2013–2015	832	78%	22%	163	79%	21%
<b>APRA</b> 2012–2014	515	91%	9%	140	95%	5%
<b>ATP</b> 2012–2014	586	82%	18%	84	87%	13%
<b>Overall</b>	<b>1933</b>	<b>83%</b>	<b>17%</b>	<b>387</b>	<b>86%</b>	<b>14%</b>

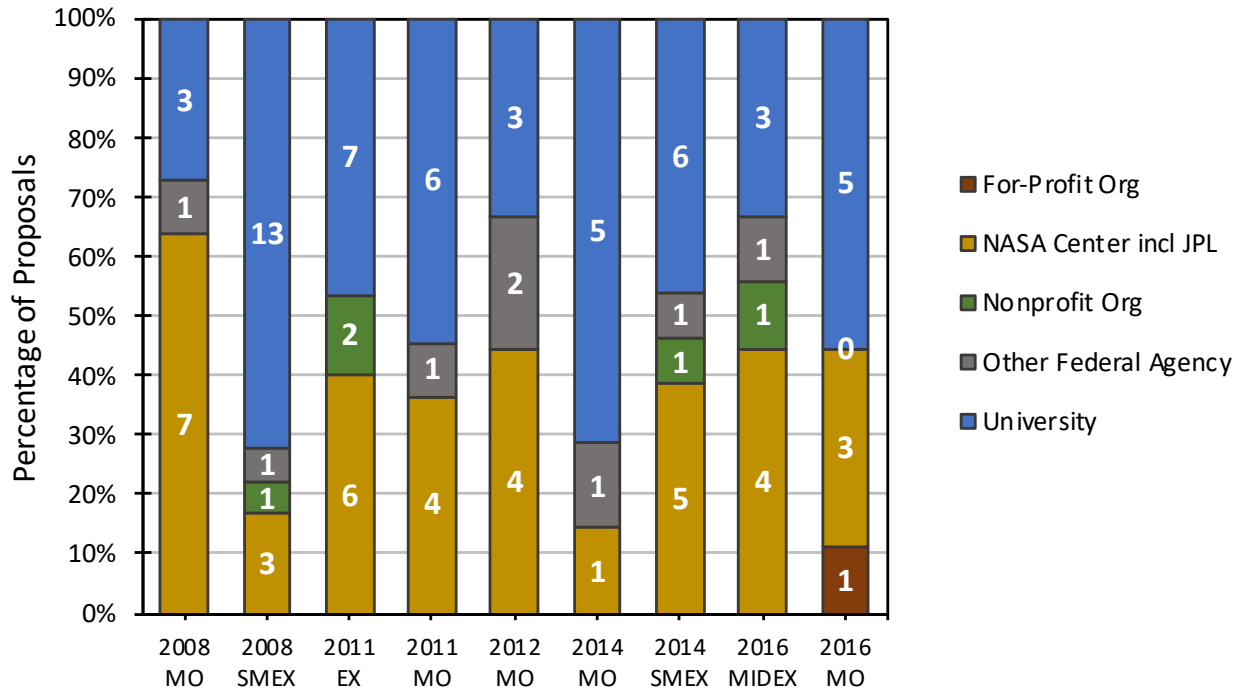
**Table S-6.** Submitted and selected proposals for the initial RTF program, shown by PI gender. This table was composed by N. Barghouty.

Roman Technology Fellowship	Submitted Phase 1 Proposals			Selected Phase 1 Proposals			Selected Phase 2 Proposals		
	Total #	# M PI	# F PI	Total #	# M PI	# F PI	Total #	# M PI	# F PI
2011	19	17	2	3	3	0	2	2	0
2012	12	10	2	2	2	0	1	1	0
2013	<i>RTF Program not offered</i>								
2014	8	7	1	3	3	0	2	2	0
2015	5	1	4	3	1	2	2	1	1
<b>Total</b>	<b>44</b>	<b>35</b>	<b>9</b>	<b>11</b>	<b>9</b>	<b>2</b>	<b>7</b>	<b>6</b>	<b>1</b>

**Table S-7.** Submitted and selected proposals for the restructured RTF program, shown by PI gender. This table was composed by N. Barghouty.

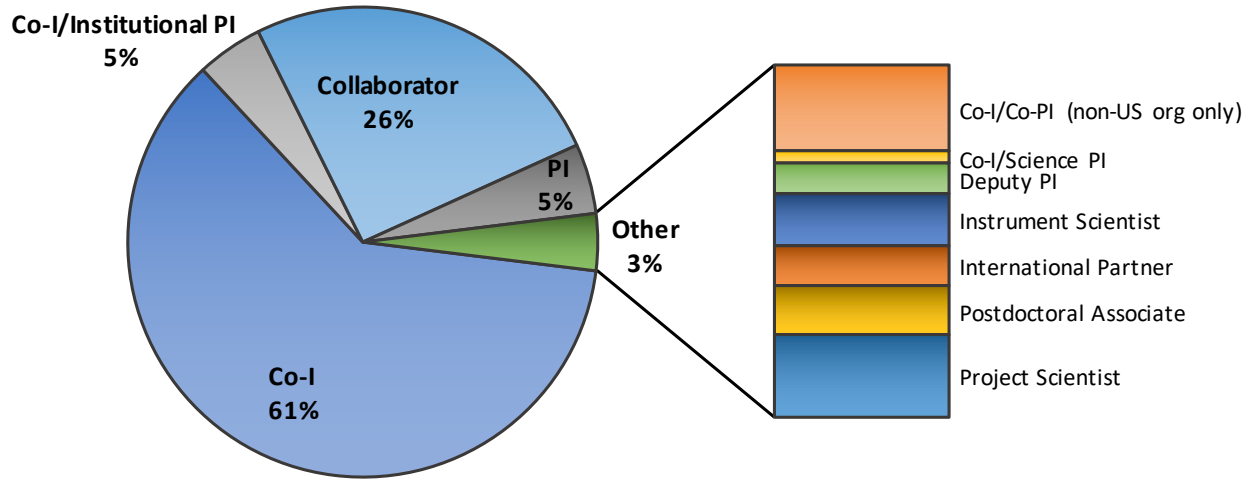
Roman Technology Fellowship	APRA Submitted & RTF Qualified			APRA Selected & RTF Qualified			RTF Selected		
	Total #	# M PI	# F PI	Total #	# M PI	# F PI	Total #	# M PI	# F PI
2016	11	9	2	3	2	1	2	1	1
2017	7	5	2	3	3	0	3	3	0
<b>Total</b>	<b>18</b>	<b>14</b>	<b>4</b>	<b>6</b>	<b>5</b>	<b>1</b>	<b>5</b>	<b>4</b>	<b>1</b>

**Number and Percentage of Proposals  
by Opportunity and Org Type**

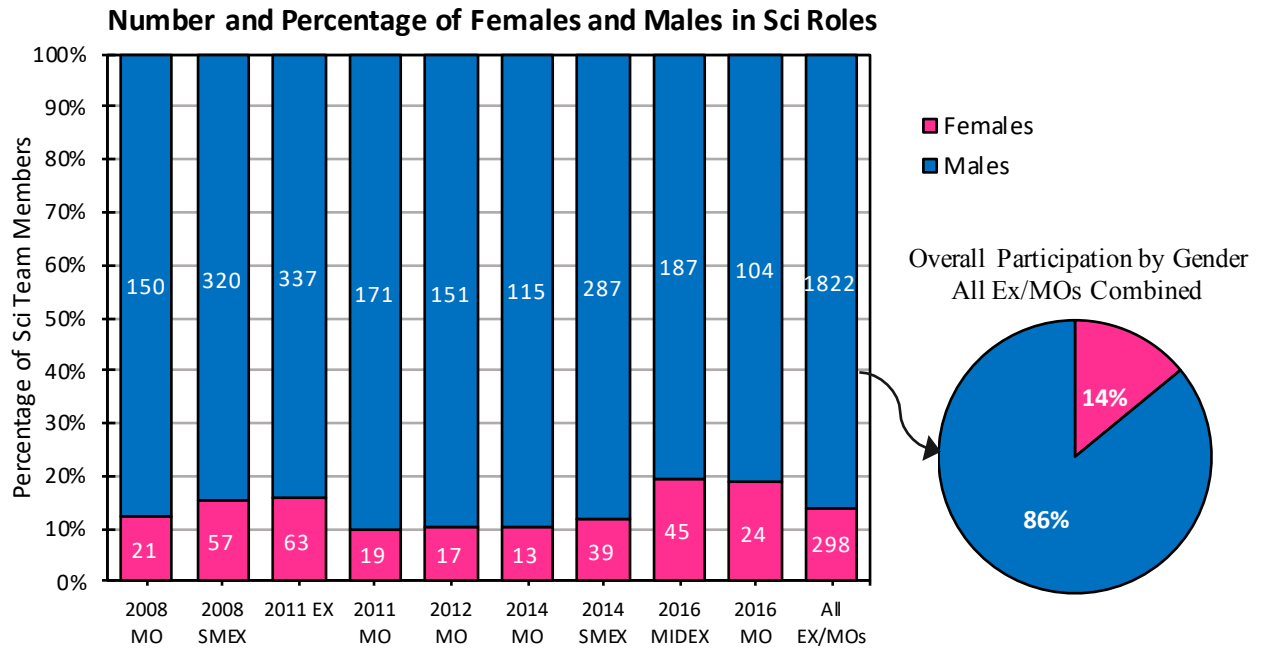


**Figure S-1.** Number and percentage of Astro Ex/MO proposals 2008–2016 by opportunity and organization type. The column shown for each opportunity reaches to the 100% level to encompass all proposals submitted. Within each bar, the percentage of proposals submitted by each organization type is shown in the color-coded segments relative to the y-axis, and the number of proposals from each type is printed within the segments.

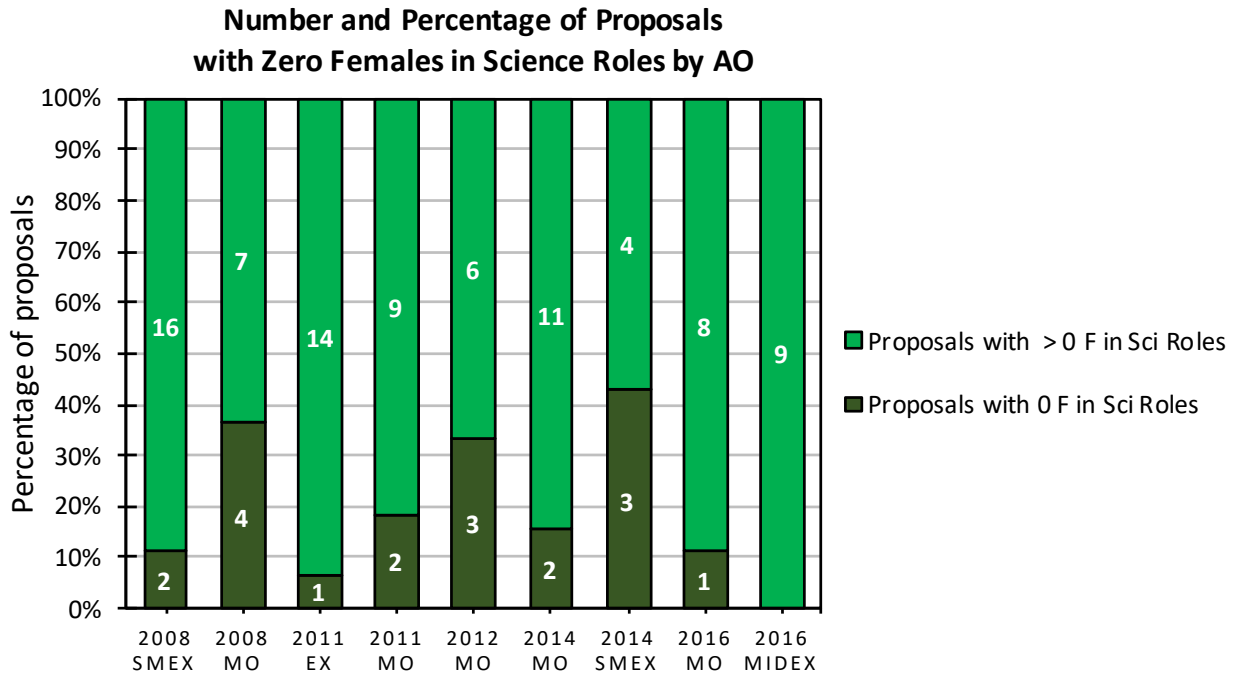
**Total Distribution of Science Roles**  
*All Ex/MO Proposals 2008 -2016*



**Figure S-2.** Total distribution of science roles (with both genders combined) for all Ex/MO proposals 2008–2016. This is a graphical representation of the data shown in the fourth column of **Table 1** in the white paper [1]. The total distribution of science roles among female participants and male participants taken separately (data in columns 2 and 3, respectively, in **Table 1** in [1]) do not show large scale differences from this plot.

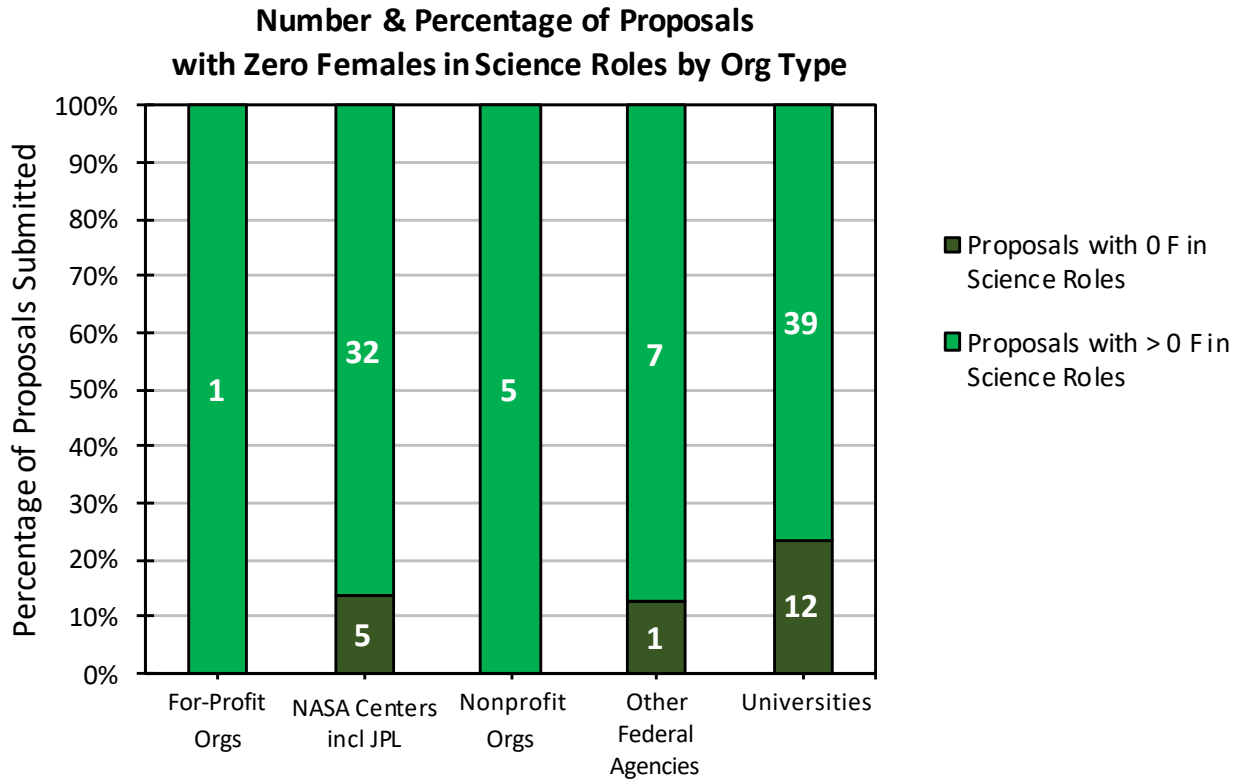


**Figure S-3.** Overall number and percentage of participants in science roles is shown for Ex/MO opportunities. The column shown for each opportunity reaches to the 100% level to encompass all science participants. Within each bar, the percentage of participants by gender is shown in the color-coded segments relative to the y-axis, and the number of participants by gender is printed in each segment. The total participation by gender (rightmost column) is recapitulated in the pie chart.

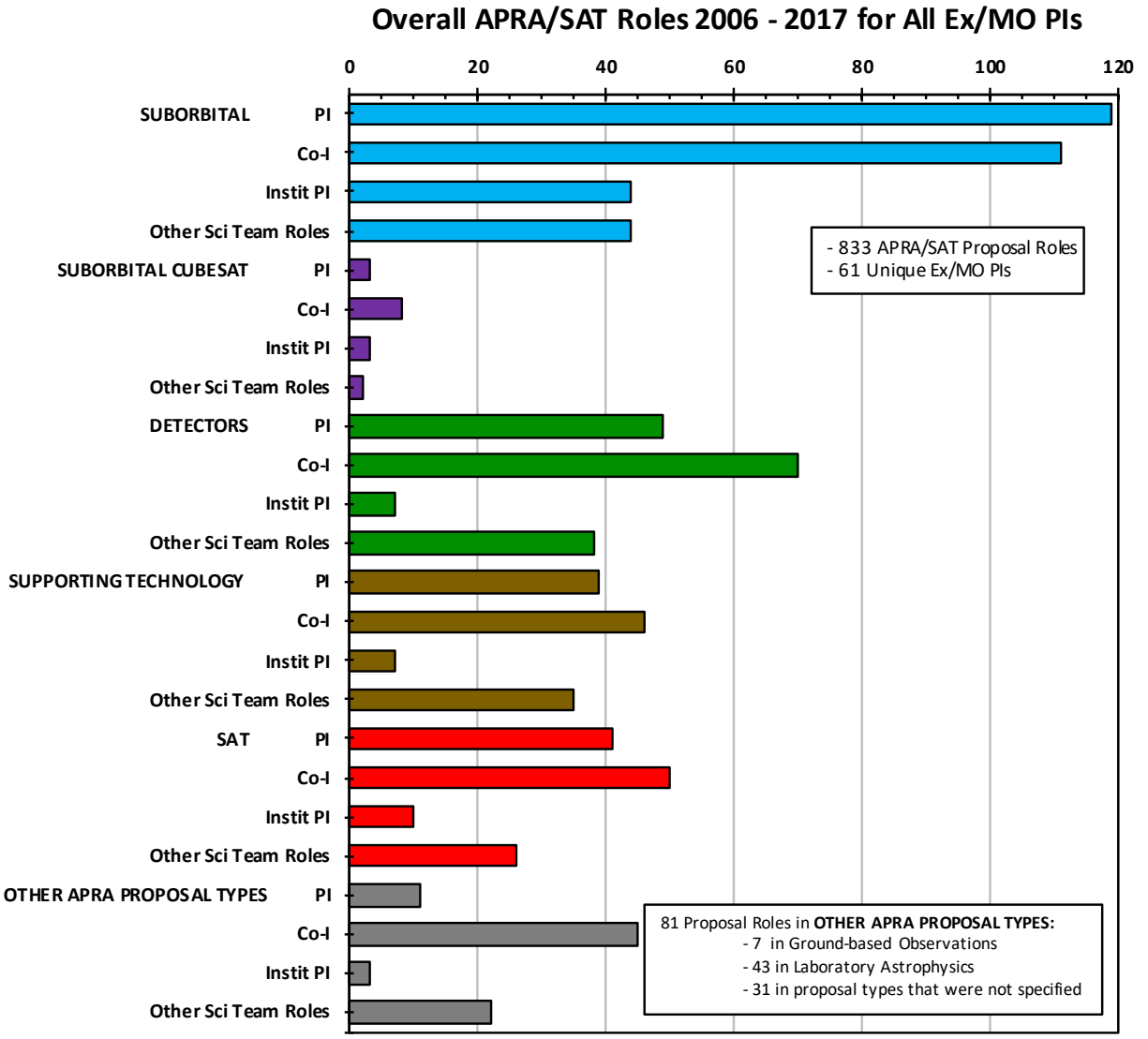


**Figure S-4.** Number and percentage of Astro Ex/MO proposals having zero females in science roles submitted to AOs during 2008–2016. The column shown for each opportunity reaches to the 100% level to encompass all proposals submitted. Within each bar, the percentage of proposals submitted with either zero females or at least one female in a science role is shown in the color-coded segments relative to the y-axis, and the number of proposals in each of these cases is printed in the segments.





**Figure S-5.** Number and percentage of Astro Ex/MO proposals having zero females in science roles. The column shown for each organization type reaches to the 100% level to encompass all proposals submitted. Within each bar, the percentage of proposals submitted with either zero females or at least one female in a science role is shown in the color-coded segments relative to the y-axis, and the number of proposals in each of these cases is printed in the segments.



**Figure S-6.** Bar chart showing all APRA/SAT roles held by the 61 unique Ex/MO PIs during 2006–2017.

## References

- 1 J. Centrella, M. New, and M. Thompson. Leadership and Participation in NASA's Astrophysics Explorer-Class Missions: *Astro2020 State of the Profession Considerations White Paper*, July 2019