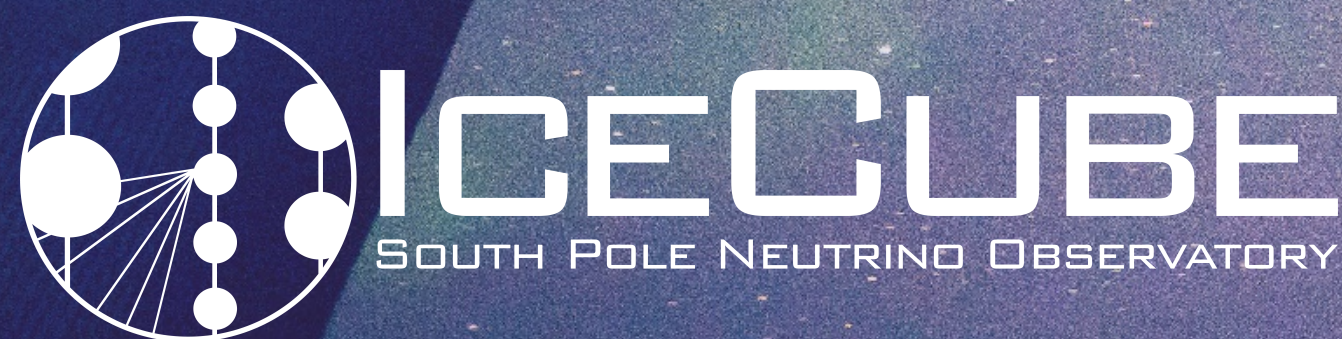


# Collaboration Report

Darren Grant  
IceCube Spokesperson  
Michigan State University

**IceCube Management and Operations**

NSF Site Visit March 16, 2020



# IceCube Collaboration - Chiba 2019



# IceCube by the numbers\*

\*many thanks Catherine!



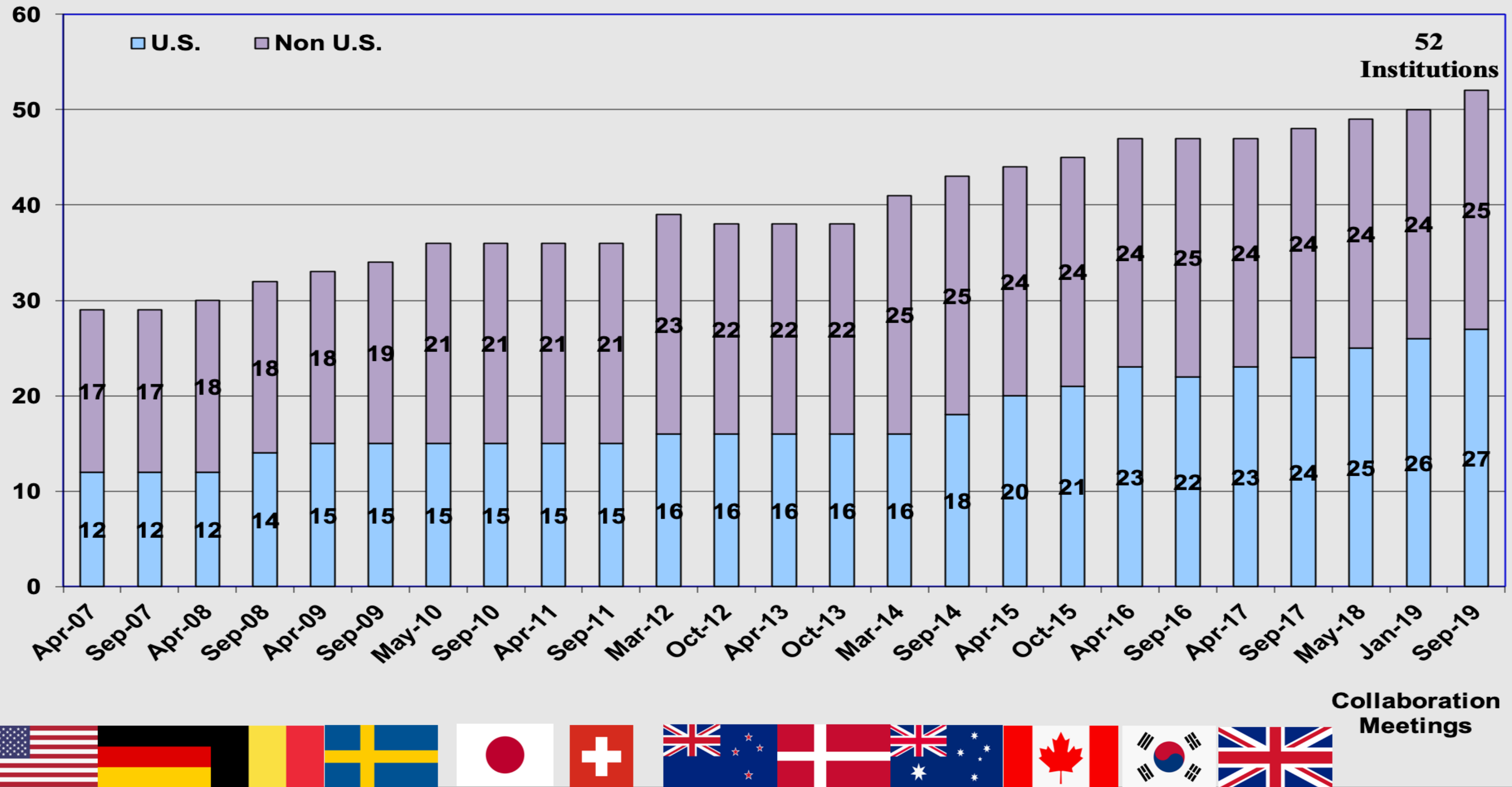
# IceCube Collaborative Institutions

## Joined IceCube:

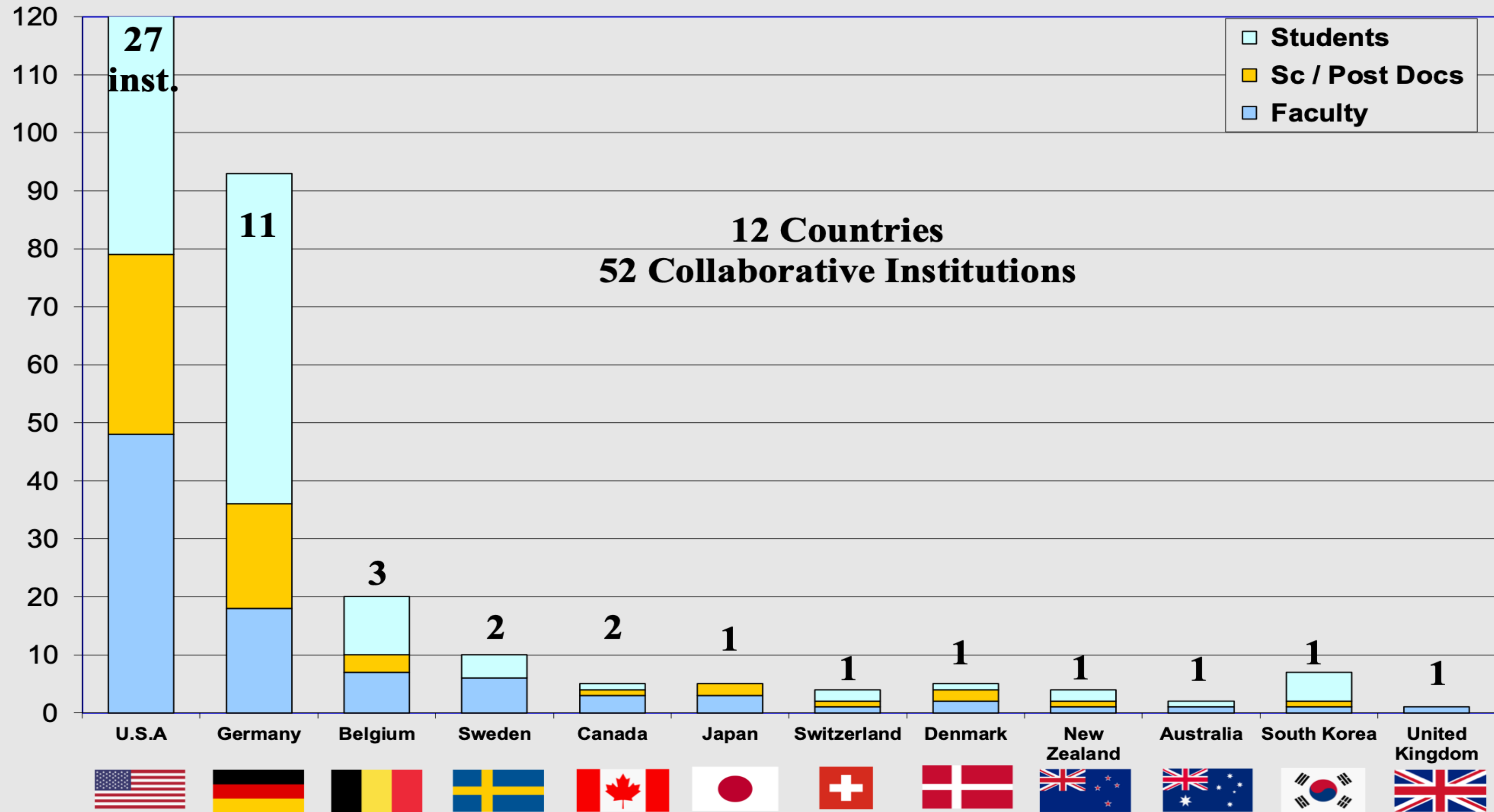
EPFL, Alabama G. Tech, Ohio State, Bochum Bonn, Alberta Barbados, Adelaide Geneva, Stony Brook Munich, SKKU, Toronto NBI Erlangen, Yale SDSMT, Drexel MSU, MIT, Marquette Rochester, Münster Queen's, Texas, Mercer KIT, UCLA, Loyola

## Left IceCube:

Utrecht, Heidelberg, Barbados, EPFL, Bonn, Toronto, Mons



## IceCube M&O MoU Summary v 27.0, September 15, 2019

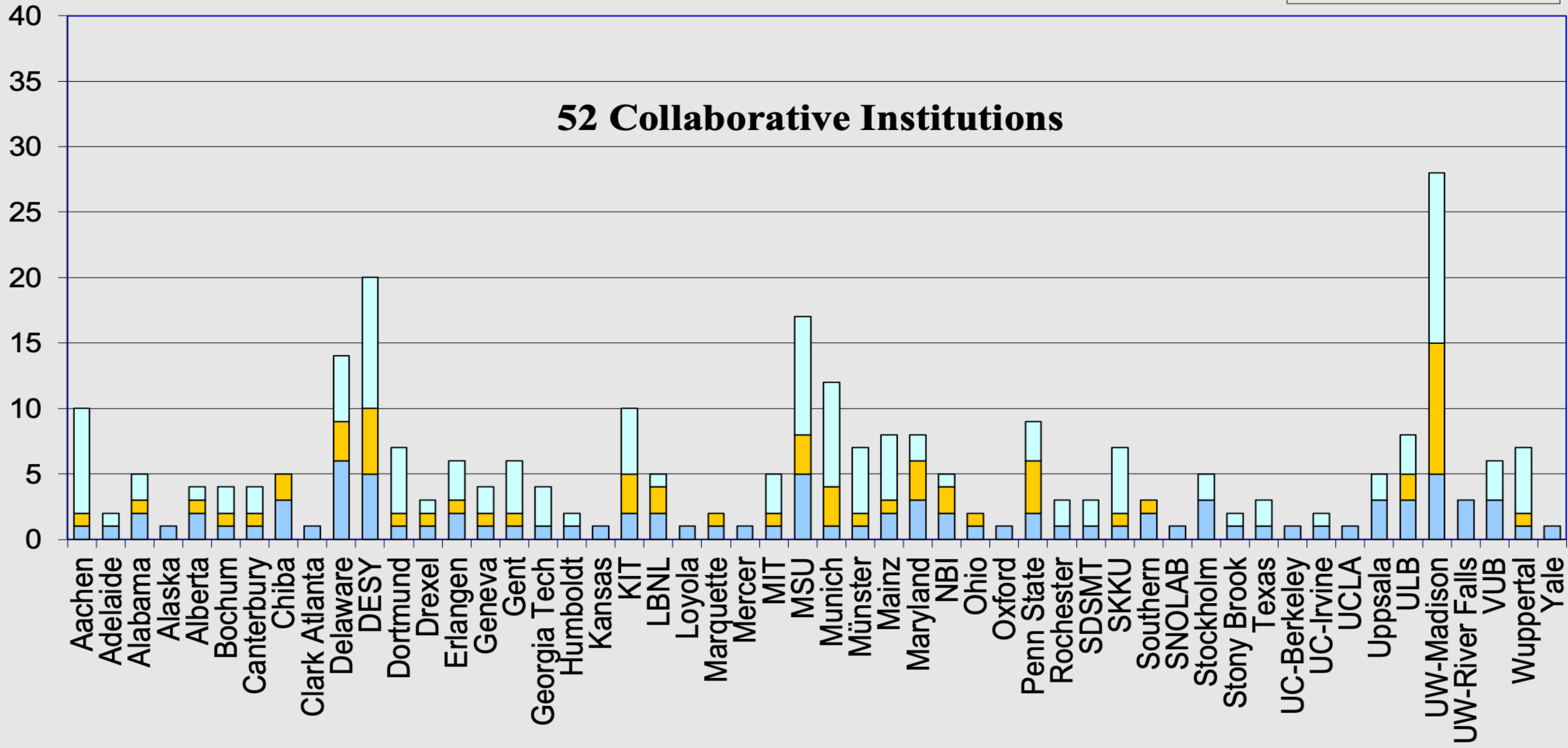


# IceCube M&O MoU Summary v 27.0, September 15, 2019

Head count



52 Collaborative Institutions



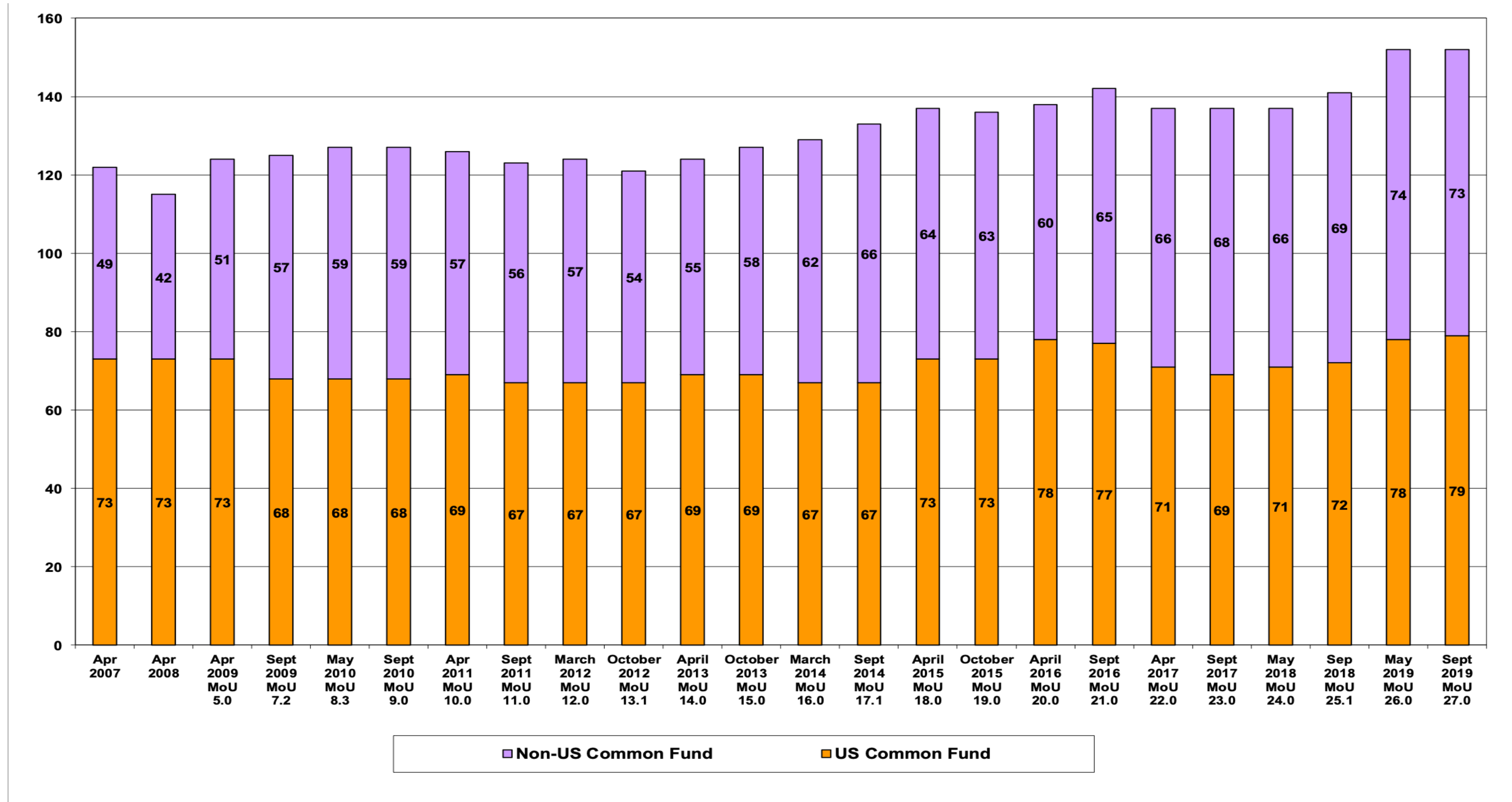
# Changes since last year

- US Institutions
  - Faculty +6
  - Scientists/Post Docs +3
  - Students increased +7
  
- Non-US Institutions
  - Faculty -1
  - Scientists/Post Docs +3
  - Students increased +1

<b>v25.0, September 2018</b>	<b>Head Count</b>				
	<b>Ph.D. Authors</b>	<b>Faculty</b>	<b>Scientists /Post Docs</b>	<b>Students</b>	<b>Total</b>
U.S. Institutions Subtotal	<b>70</b>	42	28	43	<b>113</b>
Non-U.S. Institutions Subtotal	<b>71</b>	45	26	82	<b>153</b>
<b>Total U.S. &amp; Non-U.S.</b>	<b>141</b>	<b>87</b>	<b>54</b>	<b>125</b>	<b>266</b>

<b>V27.0, September 2019</b>	<b>Head Count</b>				
	<b>Ph.D. Authors</b>	<b>Faculty</b>	<b>Scientists /Post Docs</b>	<b>Students</b>	<b>Total</b>
U.S. Institutions Subtotal	<b>79</b>	48	31	50	<b>129</b>
Non-U.S. Institutions Subtotal	<b>73</b>	44	29	83	<b>156</b>
<b>Total U.S. &amp; Non-U.S.</b>	<b>152</b>	<b>92</b>	<b>60</b>	<b>133</b>	<b>285</b>

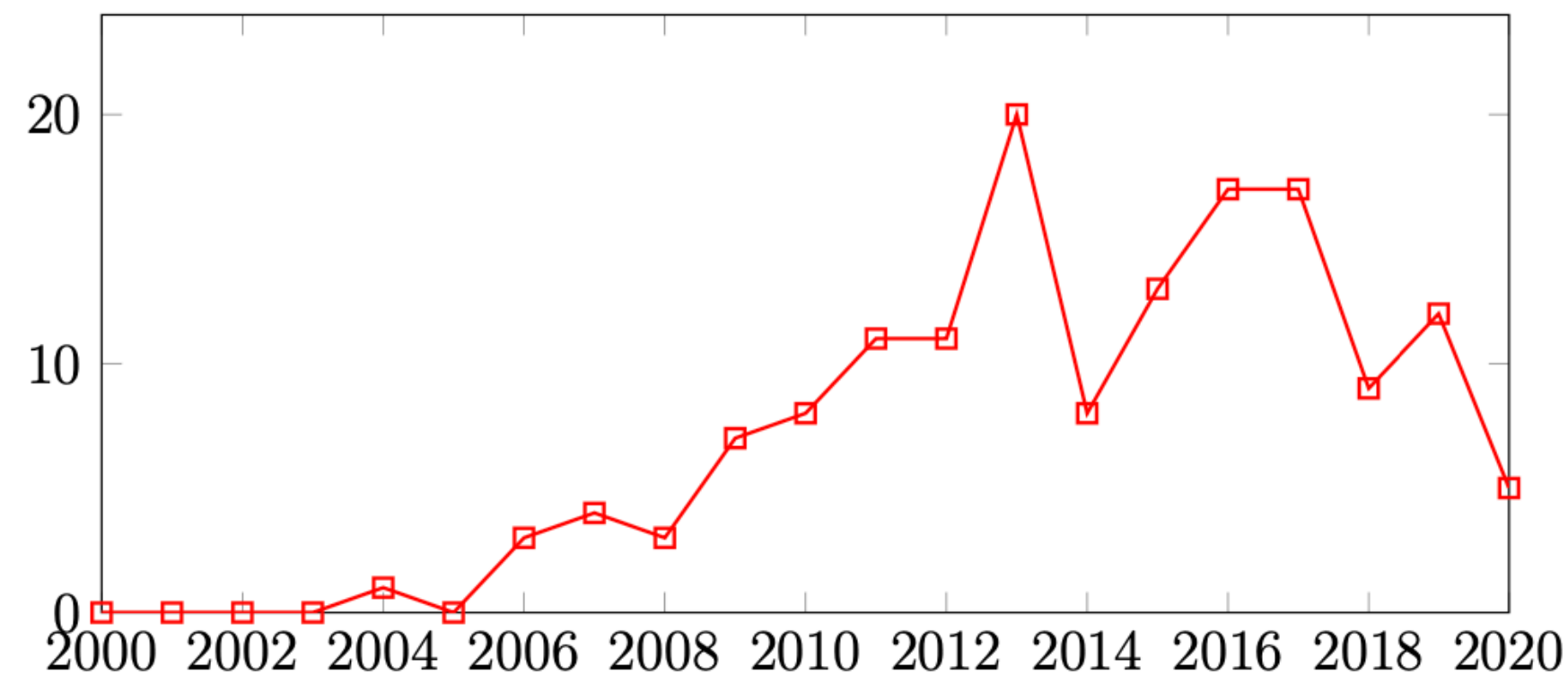
# Ph.D. Authors Head Count



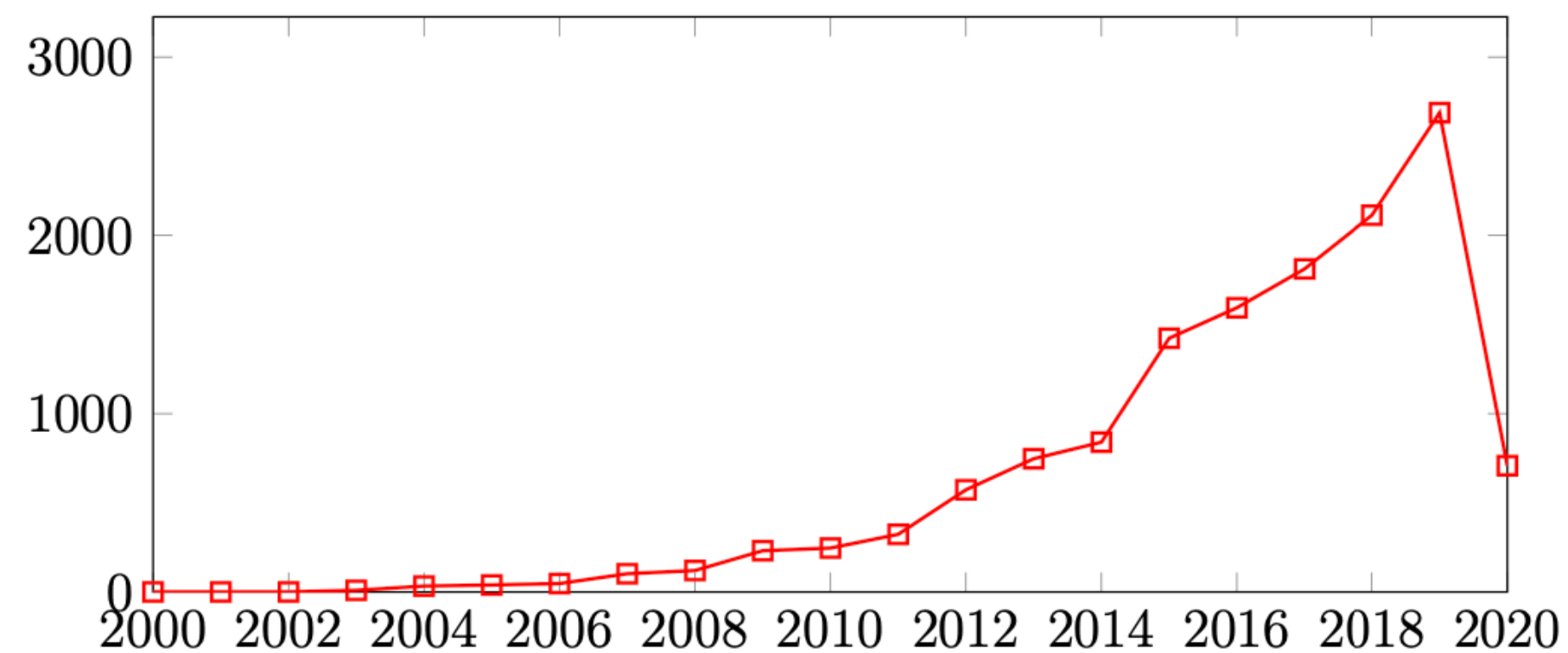


# Publication Statistics

published papers



citations (no self-cit.)

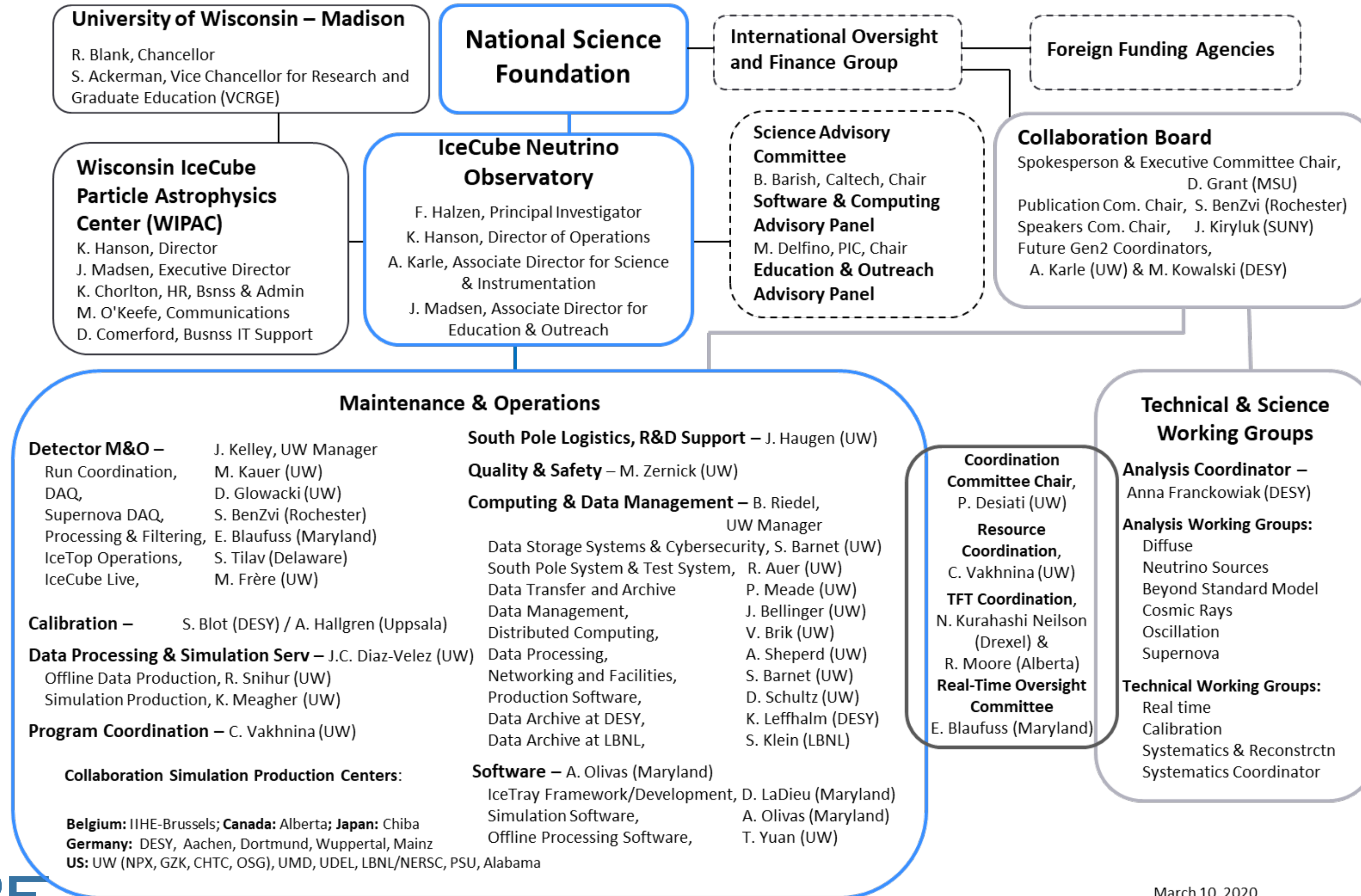


## Top 10 in none self-citations in 2019/2020:

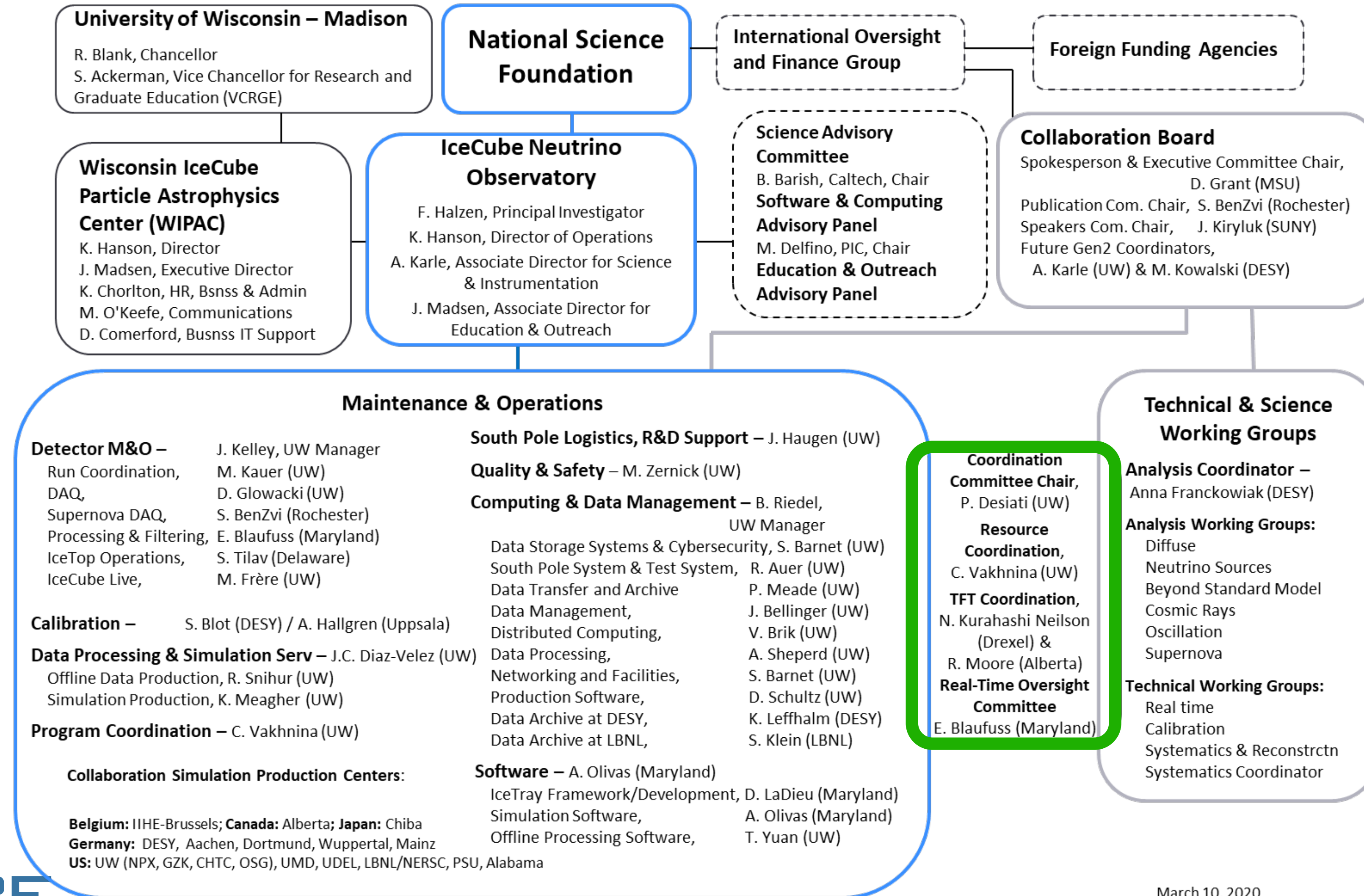
Title	Journal	# cit.
Multi-messenger Observations of a Binary Neutron Star Merger	Astrophys.J. (2017)	758
Neutrino emission from the direction of the blazar TXS 0506+056 prior to the IceCube-170922A alert	Science (2018)	190
Evidence for High-Energy Extraterrestrial Neutrinos at the IceCube Detector	Science (2013)	180
Multimessenger observations of a flaring blazar coincident with high-energy neutrino IceCube-170922A	Science (2018)	158
Observation of High-Energy Astrophysical Neutrinos in Three Years of IceCube Data	Phys.Rev.Lett. (2014)	139
Observation and Characterization of a Cosmic Muon Neutrino Flux from the Northern Hemisphere using six years of IceCube data	Astrophys.J. (2016)	118
First observation of PeV-energy neutrinos with IceCube	Phys.Rev.Lett. (2013)	82
A combined maximum-likelihood analysis of the high-energy astrophysical neutrino flux measured with IceCube	Astrophys.J. (2015)	80



# Collaboration organization



# Collaboration organization



# Board Activities

On average approximately 30 items are discussed in depth (and often voted\* on) each year:

- Institutional and associate memberships
- Policy development and updates
- Memoranda of understanding (MOUs) with other projects
- Amendments to the collaboration governance

\*Voting on items takes place confidentially via GoogleForms

# Board Activities (2019)

- Collaboration membership:
  - Institutional membership may be considered for any group via application to the board (received by the spokesperson)
  - Associate membership (typically for a dedicated analysis or hardware topic) occurs via application sponsored by an IceCube member institution.
  - Typically for new institutions in a country with existing members guidance is sought on impact to on-going funding and activities
    - For new countries (eg. China in 2018), broader guidance is solicited from lead project agencies
- 5 applications
  - 3 full member (KIT, Loyola passed; Columbia pending)
  - 2 associate member (King's College London passed; Earth tomography consortium pending)

# Board Activities (2019)

Policy development and updates:

- Approved legacy authorship policy
- Incorporation of radio activities formally within IceCube(-Gen2)

# Board Activities (2019)

## MOUs with partner projects:

- Streamline MOU agreements process with standardized template
- Agreements generally 3 year and are renewable
- Used extensively both for the TXS analyses/publications and the recent M77 results
- 5 new and updated MOUs in the past year.
- New MOUs underway with established radio projects for Gen2 developments

# Board Activities (2019)

## Governance amendments:

- Amendment for approval of member senior scientists at post-IceCube-construction institutes



# Future Collaboration Meetings

- May 9 - 16, 2020 - Brussels Belgium
- September 19 - 25, 2020 - Madison WI, USA
  - 10 year celebration of IceCube detector completion September 21
- March 2021 - Aachen Germany

