International Research Results and Accomplishments From the International Space Station

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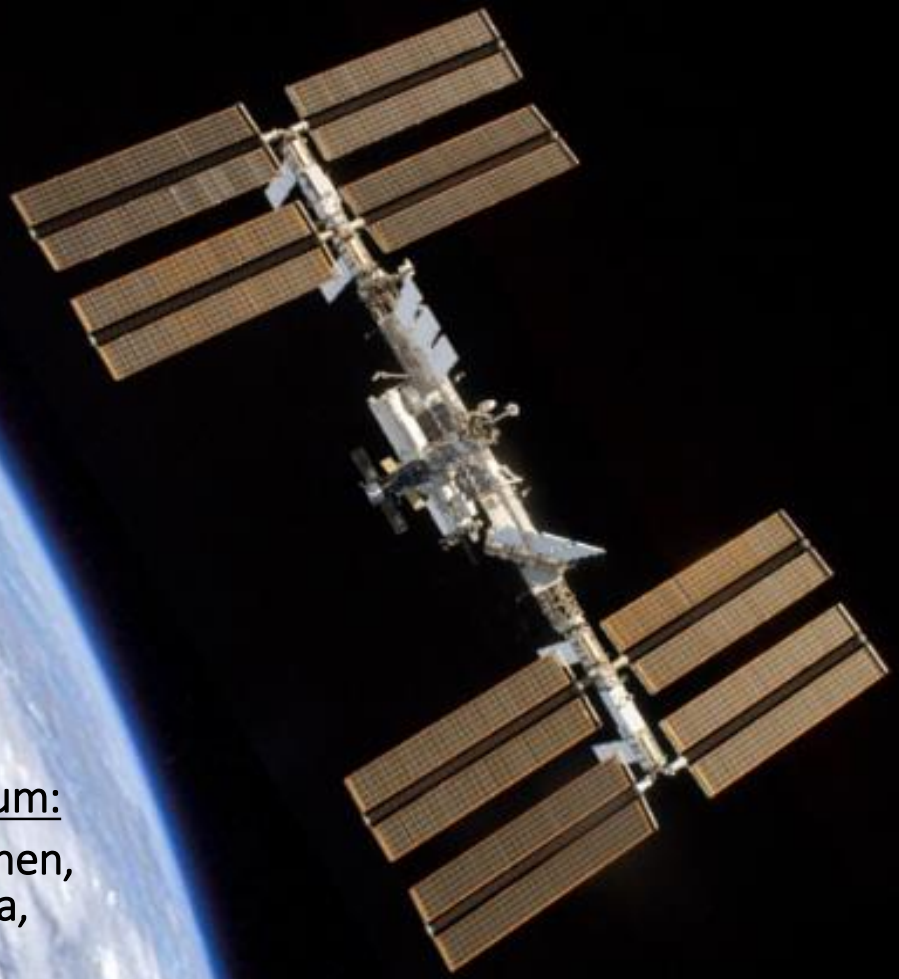
Robinson, Ruttley, Tate-Brown, Perkins, Cohen, Marcil, Heppener, Hatton, Tasaki, Umemura, Karabadzhak, Sorokin, Cotronei, Sabbagh. September 2016.



How Do We Show the Impacts of ISS Utilization?

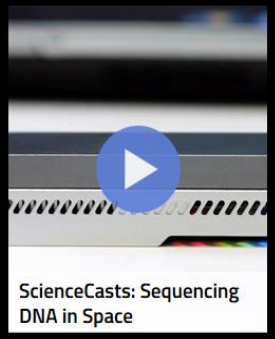
Scientific Discovery

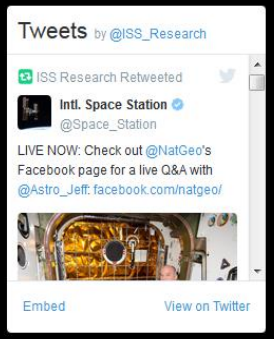
Benefits for Humanity

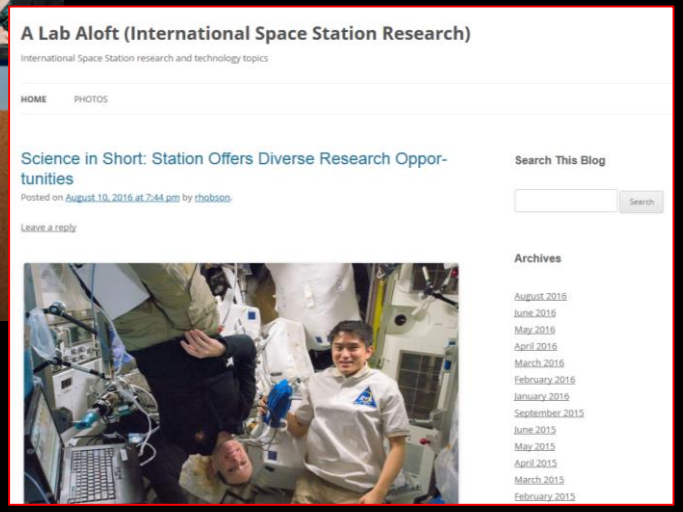
Enabling Future Exploration

Ways We Communicate the Impacts of ISS Utilization

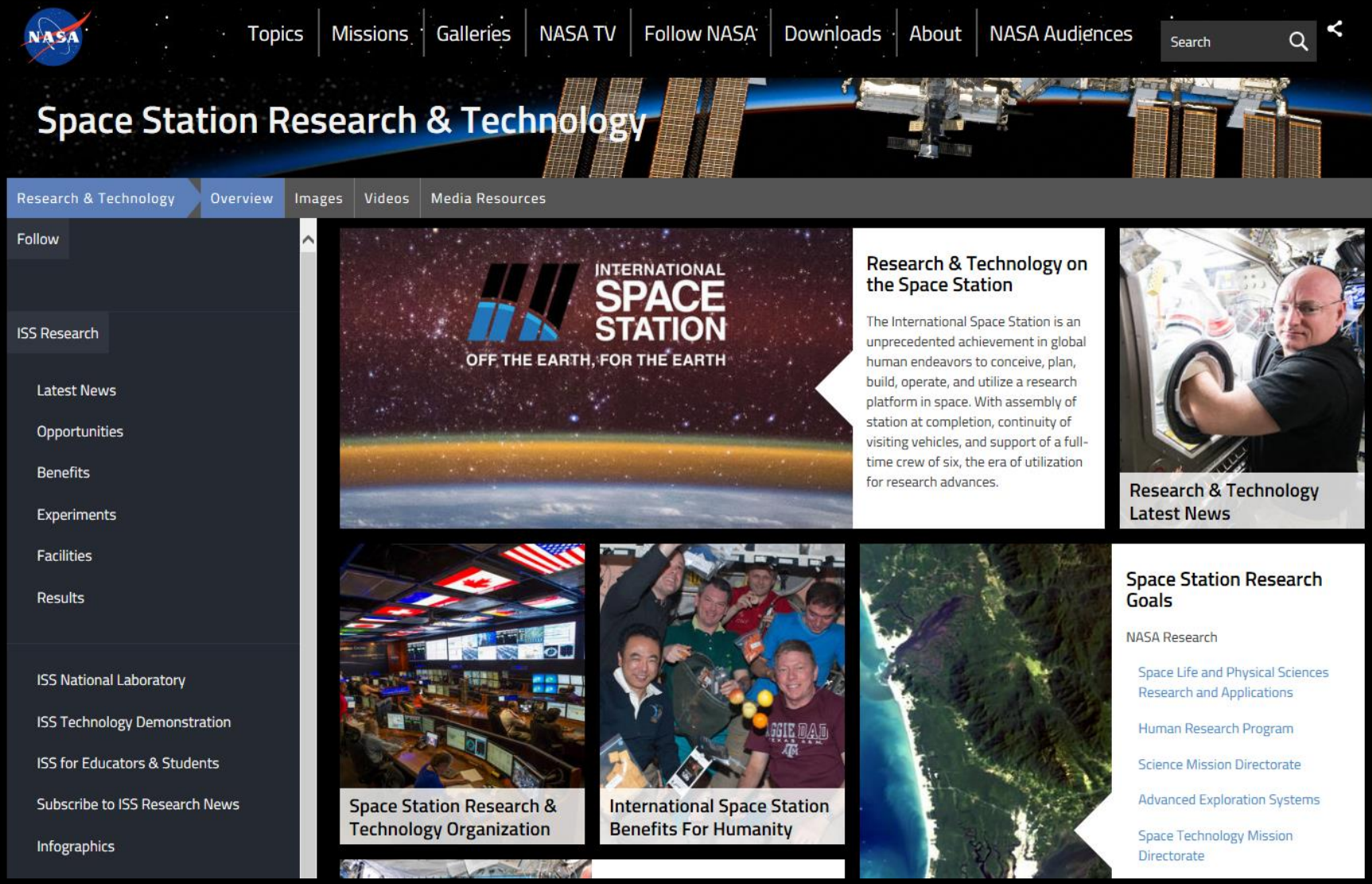
Blogs
Stories
Multi-Media
Social Media
Media Briefings
Scientific Presentations





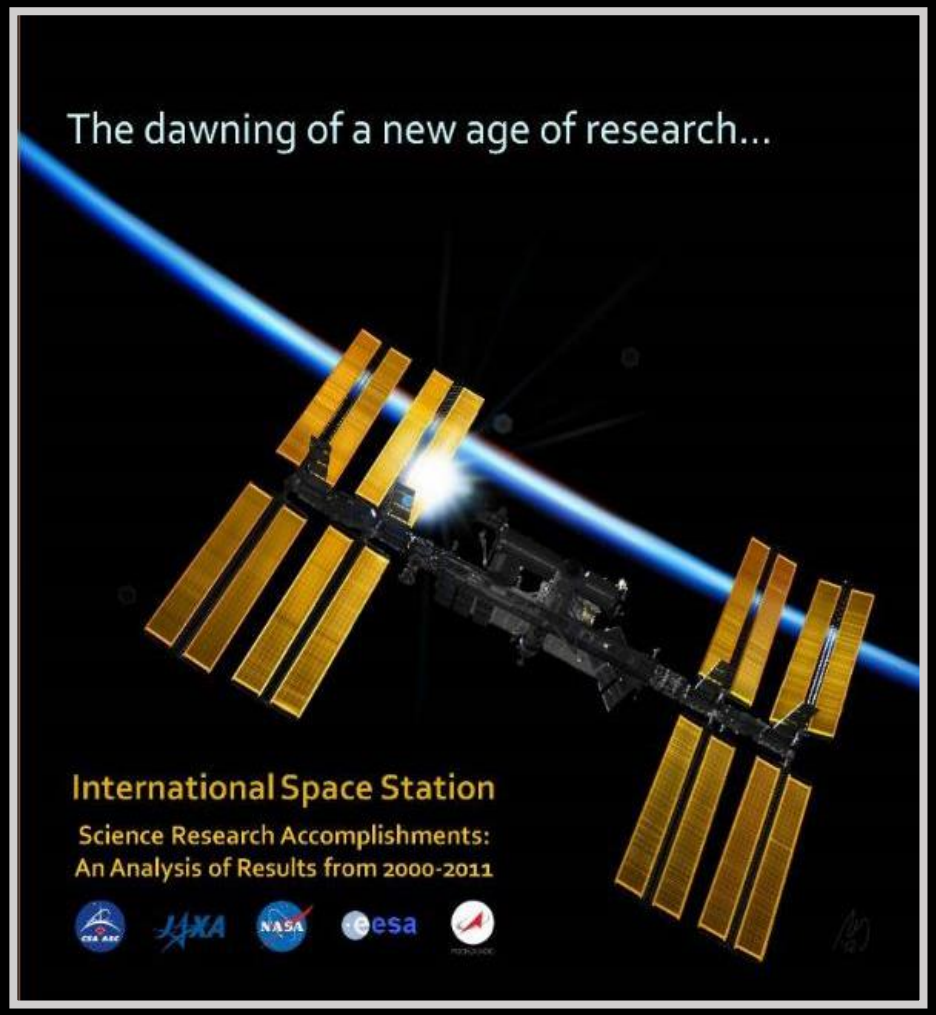


The ISS International Archive of Research and Results
www.nasa.gov/iss-science



ISS Science Research Accomplishments: 2000-2011

The ISS Program Science Forum has published the first-ever compilation of international ISS Results for investigations published through the year 2011.

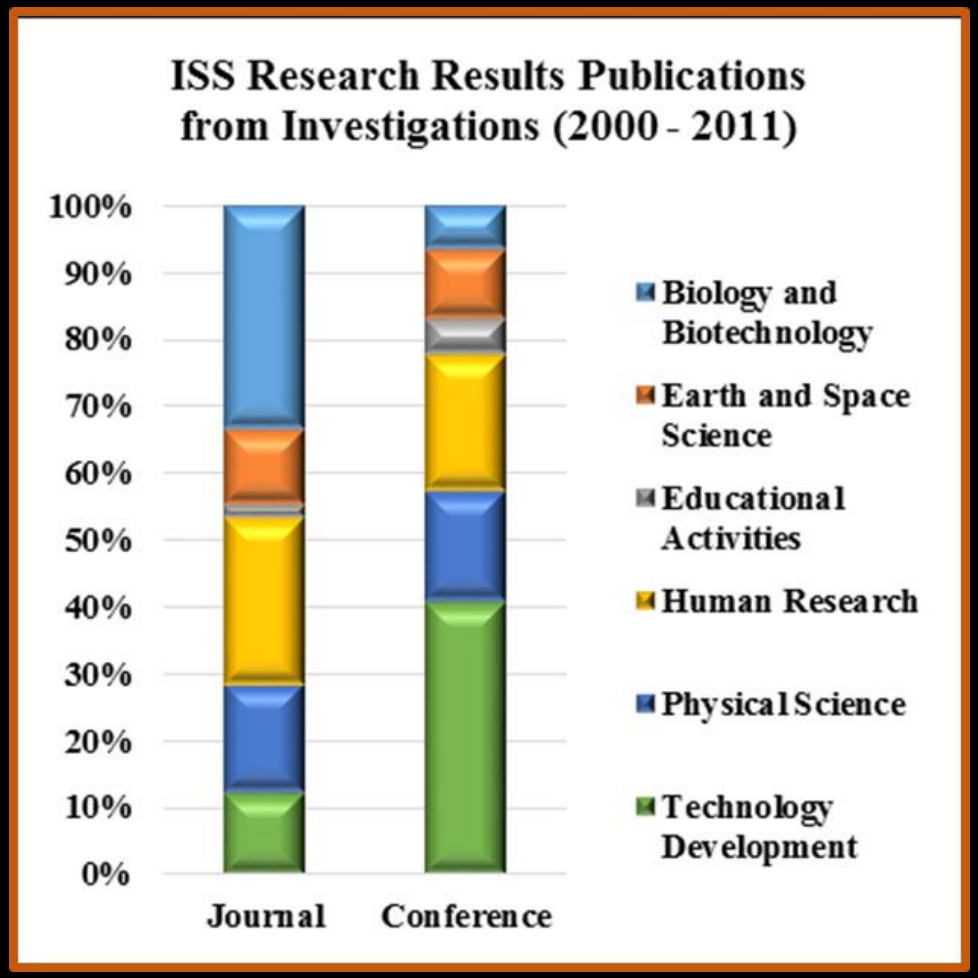


Tracking Results from ISS Utilization

- A team of professionals in NASA's ISS Program Science Office mine for publications from ISS research and technology development through many ways, including:
  - keyword searches with various tools and search engines
  - databases such as AIAA, IEEE, IngentaConnect, JSTOR, J-STAGE, ScienceDirect, Wiley
  - Web of Science
  - conference proceedings
  - science networks such as ResearchGate
  - email alerts from systems such as Pubmed, Google Scholar, Nature Partner Journal-Microgravity
  - NASA Taskbook, and others
  - ISS investigator and international partner websites
  - personal email exchanges with ISS investigators and international partners

ISS Science Research Accomplishments: 2000-2011

A the time of publication, over 1200 journal publications, 59 patents and over 400 conference proceedings were collected from ISS research.



How Do We Show How ISS Knowledge Impacts Science?

- ESA scientists published Genara-A molecular evidence of plant seedling stress response to the microgravity environment in PLoS One *[Mazars et al. 2014].*

- Roscosmos scientists published in PLoS One that long-duration data has led to new tools for immunological testing in space and in remote and resource-restricted areas on Earth *[Pastushkova et al. 2013].*

- CSA scientists from the CCISS investigation published in the Journal of Applied Physiology that the current countermeasures on ISS are sufficient to maintain cardiovascular health, and can provide insight into cardiovascular maintenance on Earth *[Hughson et al. 2012].*

- JAXA investigators published MAXI observations in Nature of a “first-ever”: the instant that a massive black hole swallowed a star, which had before been only a theory *[Burrows et al. 2011].*

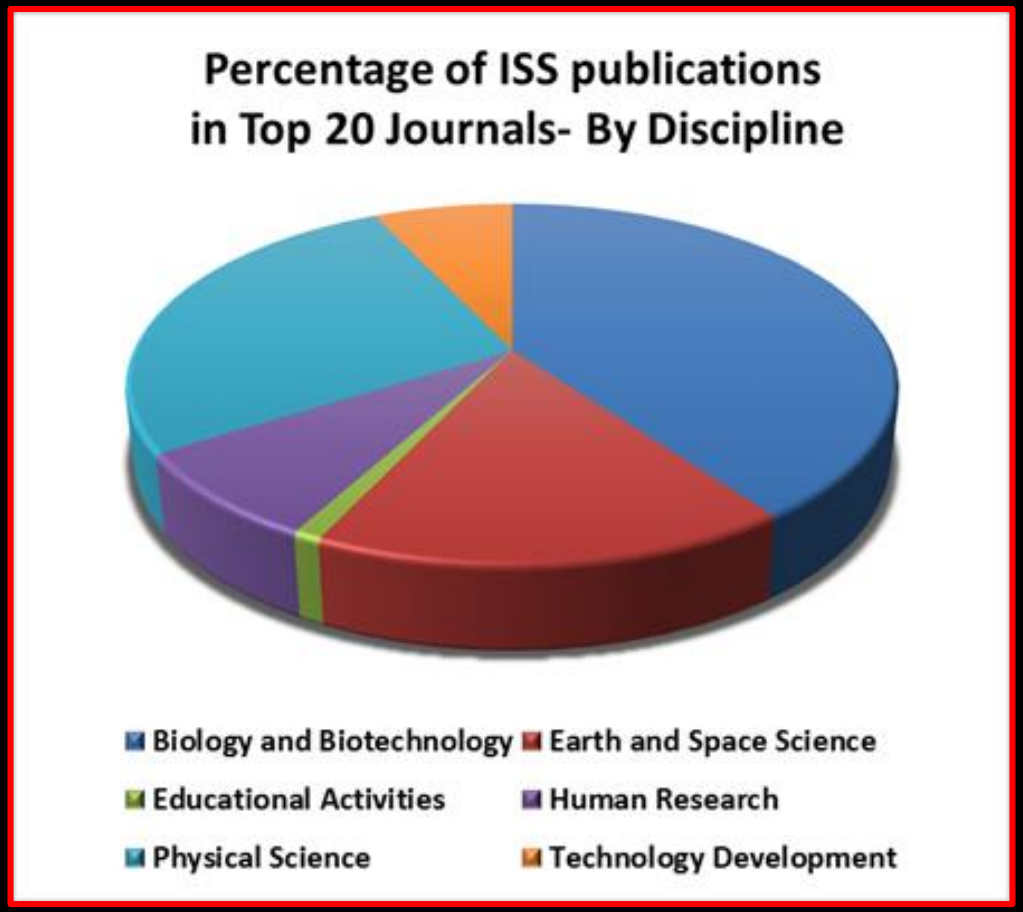
- The global team of scientists in the NASA-sponsored AMS-02 investigation challenged theoretical models of cosmic predications for evidence of elusive dark matter in Physical Review Letters, as the instrument was the first to sift through galactic cosmic rays in energy ranges beyond 200Gev
[Aguilar-Benitez et al. 2014].

- One of the earliest ISS investigations was also highly collaborative: the ICE-First investigation included investigators from France, Canada, Japan, and the United States to study the effects of the spaceflight environment on living systems, using the Caenorhabditis elegansas the model organism of study radiobiology, muscle protein changes, ageing, radiation effects on living organisms, apoptosis, and DNA damage and repair.

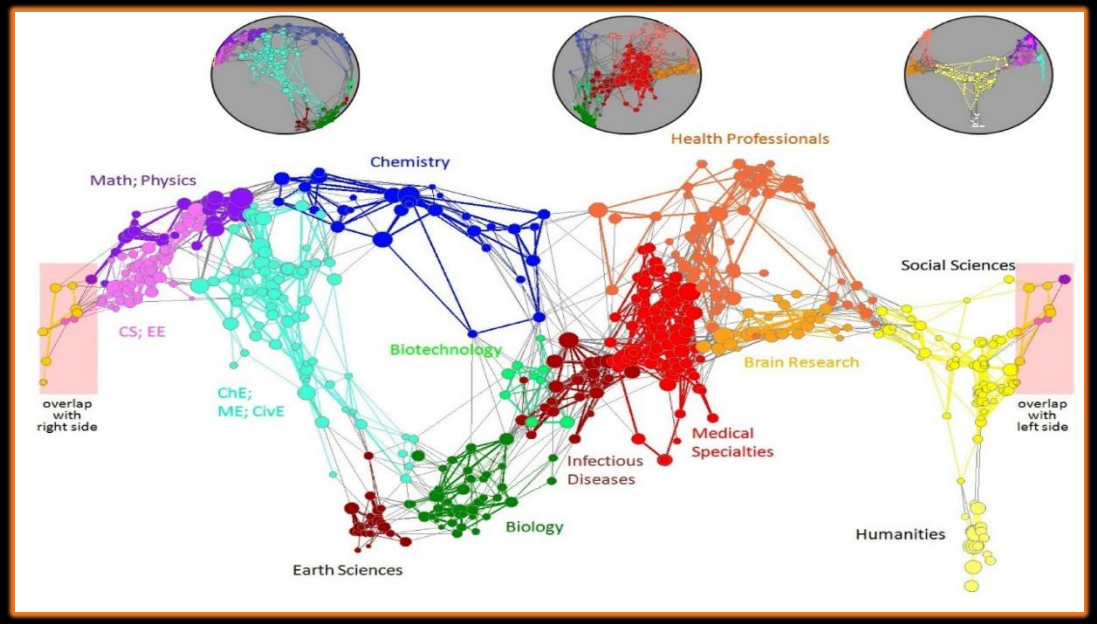
How Do We Show How ISS Knowledge Impacts Science?

Top 20 Journals with ISS Results (Number of Publications)	Times Cited
PLOS ONE (36)	303
Nature (1)	165
Proceedings of the National Academy of Sciences of the United States of America (3)	139
Science (3)	31
Physical Review Letters (23)	839
Journal of Biological Chemistry (2)	52
Chemical Communications (1)	72
Journal of Neuroscience (1)	76
Advanced Materials (1)	72
Journal of Geophysical Research (5)	179
Physical Review D - Particles, Fields, Gravitation and Cosmology (1)	2
Optics Express (2)	35
Scientific Reports (6)	41
Chemistry - A European Journal (1)	73
Geophysical Research Letters (1)	22
NeuroImage (1)	23
Journal of Chemical Physics (4)	41
Langmuir (2)	18
Physical Review E, Statistical, Nonlinear, and Soft Matter (11)	212
The Astrophysical Journal (1)	9

By Eigenfactor, which is the rating of the total importance of a scientific journal.



The Future:
How Do We Show How ISS Knowledge Impacts Science?



The University of California San Diego (UCSD) Map Of Science
http://sci.cns.iu.edu/ucsdmap/

Figure: Broner et al. 2012. *PLoS One July 7(7):*e39464

National Academies of Science
"AcademyScope"
https://www.nap.edu/academy-scope

NASA ISS Research & Technology Resources

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Benefits: www.nasa.gov/stationbenefits