

AWS & University Research

# Research Programs (Click Hyperlinks for more info)

Initiative	Description	Support Offering
<a href="#">AWS Research Cloud Program</a>	Best practices offering supporting Researcher's efforts to establish the IT environment they need quickly, effective, and securely so they accelerate their time to science	<ul style="list-style-type: none"> <li>• 242 page Researcher's Handbook</li> <li>• Community Support</li> </ul>
<a href="#">Amazon Research Initiative</a>	<b>AWS and the National Science Foundation (NSF)</b> Collaborate to Foster Innovation in Big Data Research. Grant Eligible Disciplines: <ul style="list-style-type: none"> <li>• Hybrid Computing - Auto expansion to Cloud using on-prem infrastructure for Campuses</li> <li>• Flexible HPC, Serverless Computing, etc.</li> <li>• Data Analytics using (distributed) ML, Deep Learning, Notebooks, etc.</li> <li>• Cloud-based integrated development and teaching environments</li> <li>• Data Sharing / Data Lakes / Open Data</li> <li>• Streaming Analytics</li> <li>• Internet of Things</li> <li>• Education and Training</li> </ul>	<ul style="list-style-type: none"> <li>• Cash Grant Awards</li> <li>• AWS Credits</li> <li>• Proposal Content Support</li> </ul>
<a href="#">AWS Cloud Credits for Research</a>	The AWS Cloud Credits for Research Program (formerly AWS Research Grants) supports researchers who seek to: <ul style="list-style-type: none"> <li>• Build cloud-hosted publicly available science-as-a-service applications, software, or tools to facilitate their future research and the research of their community.</li> <li>• Perform proof of concept or benchmark tests evaluating the efficacy of moving research workloads or open data sets to the cloud.</li> <li>• Train a broader community on the usage of cloud for research workloads via workshops or tutorials.</li> </ul>	<ul style="list-style-type: none"> <li>• AWS Credits</li> </ul>
<a href="#">AWS Educate</a>	Amazon's global initiative to provide students comprehensive resources for building skills in cloud technology. It is a no cost curriculum that gives access to content, training, collaboration tools, AWS technology, and a job board with employment opportunities.	<ul style="list-style-type: none"> <li>• Access to Content and Tools</li> <li>• \$100 AWS Credits</li> </ul>
<a href="#">AWS Machine Learning Research Awards</a>	The AWS Machine Learning Research Awards (MLRA) program funds eligible universities, faculty, PhD students and post-docs under the supervision of faculty, that are conducting novel research in machine learning (ML)	<ul style="list-style-type: none"> <li>• Unsecured Gifts in the form of Cash and AWS Credits</li> </ul>

# Research Programs

Initiative	Description	Support Offering
<a href="#">Amazon Research Awards</a>	<p>Quarterly award given to applicants who are faculty at academic institutions worldwide whose research is focused in the following areas: (Currently Calling for Proposals)</p> <ul style="list-style-type: none"><li>• Computer vision</li><li>• Economics</li><li>• Knowledge management and data quality</li><li>• Machine learning algorithms and theory</li><li>• Natural language processing</li><li>• Operations research and optimization</li><li>• Personalization</li><li>• Robotics</li><li>• Search and information retrieval</li><li>• Security, privacy and abuse prevention</li><li>• Speech</li></ul> <p>To encourage collaboration and the sharing of insights, each funded proposal team is assigned an appropriate Amazon research contact. We also invite ARA recipients to speak at Amazon offices worldwide about their work and to meet with our research groups face-to-face, and encourage ARA recipients to publish their research outcome and commit related code to open-source code repositories.</p>	<ul style="list-style-type: none"><li>• Up to \$80,000 in Unrestricted gifts (Cash and Credits)</li></ul>
<a href="#">Cloud Credits for Earth Observation Research</a>	<p>Current Cloud Credits for Research with Active Call for Proposals focused on researchers leveraging <a href="#">Earth on AWS Datasets</a></p>	<ul style="list-style-type: none"><li>• AWS Credits</li></ul>



# AWS support for academic research



Irena Zlatanovic, Sr. Program Manager, Cloud Credits for Research Program

March 22, 2018

# Supporting the mission of higher education

- **Discovery**

## **Education**



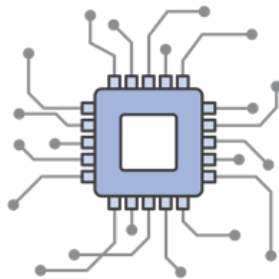
Scientific Computing

Open Data

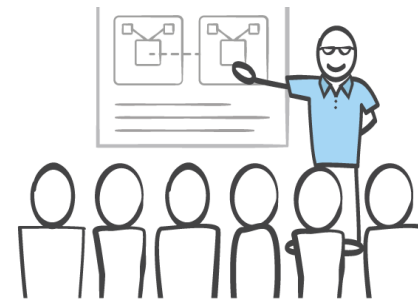
Earth on AWS

Amazon Research Awards

AWS Machine Learning Research Awards



AWS Academy



# AWS programs supporting research

## Research and Technical Computing

- Dedicated team of scientific experts focusing on scientific computing and research workloads.
- Developing solutions to enable researchers to benefit from AWS.

## Public Datasets

- AWS hosts large and globally significant datasets for community use.
- Developing solutions to enable researchers to use AWS to host their own datasets.

## Cloud Credits for Research

- AWS "grant" program to support individual research projects to faculty, staff, and students.

# AWS Research Cloud Program



**Science first, not servers.**



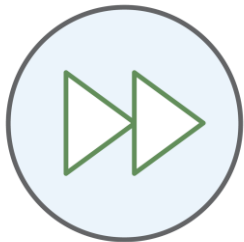
**Simple start up procedures.**



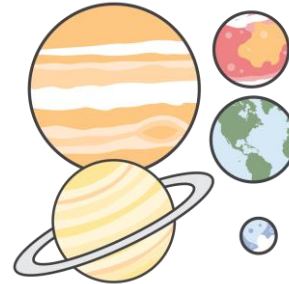
**Budget management tools.**



**Best practices for data security.**

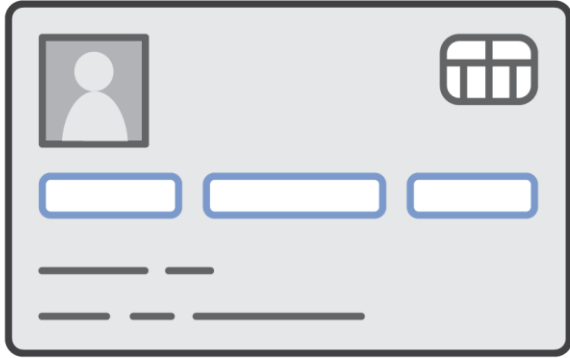


**Solutions to procurement challenges.**

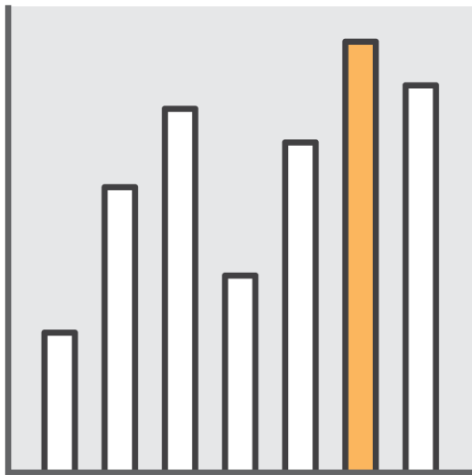


**Large catalog of research Solutions.**

# Solving Procurement Challenges



**Invoice-backed billing** means no need for credit cards in order to sign up to AWS and use services. **Simple procedure** to be on-boarded quickly.



**Global Data Egress Waiver** removes data egress charges (typically ~3-5%) from monthly bills so researchers don't have to estimate the cost of data movement between the cloud and their on premise services.



**Single Sign-up**



# AWS Cloud Credits for Research cloud credits for research

AWS has been providing credits toward AWS services to researchers since 2009. An average \$ per project is between \$10k-\$20k.

We support researchers who seek to:

- **Build reusable tools** to facilitate their future research and the research of their community
- **Perform proof of concept or benchmark tests** evaluating the efficacy of moving research workloads or open data sets to the cloud
- **Train a broader community** on the usage of cloud for research workloads via workshops or tutorials

# Application Process

Online application: <http://aws.amazon.com/research-credits/>

Proposal should contain the following information:

1. Brief description of problem to be solved.
2. Proposed AWS solution (including specific AWS tools, timeline, key milestones).
3. Plan for sharing outcomes (tools, data, and/or resources) created during project.
4. Any potential future use of AWS beyond grant duration by individual research group or broader community.
5. Names of any AWS employees you have been in contact with (this is not a prerequisite for the application).
6. Any AWS Public Data Sets to be used in your research.
7. Keywords to facilitate proposal review.

We also ask for a budget estimate using simple monthly calculator:

<https://calculator.s3.amazonaws.com/index.html>

## Security Challenges for the Public Cloud



Kui Ren, Cong Wang, and Qian Wang • Illinois Institute of Technology



## Comparing FutureGrid, Amazon EC2, and Open Science Grid for Scientific Workflows

Gideon Juve<sup>1</sup>, Mats Rynge<sup>1</sup>, Ewa Deelman<sup>\*1</sup>, Jens-S. Vöckler<sup>1</sup> and G. Bruce Berriman<sup>2</sup>

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\* Corresponding author



*Starfish*  
Self-tuning Analytics System

## GPS: A Graph Processing System\*

Semih Salihoglu and Jennifer Widom

Stanford University



*Caffe: Deep Learning  
Framework*  
developed at UC Berkeley

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## Practical Bayesian Optimization of Machine Learning Algorithms

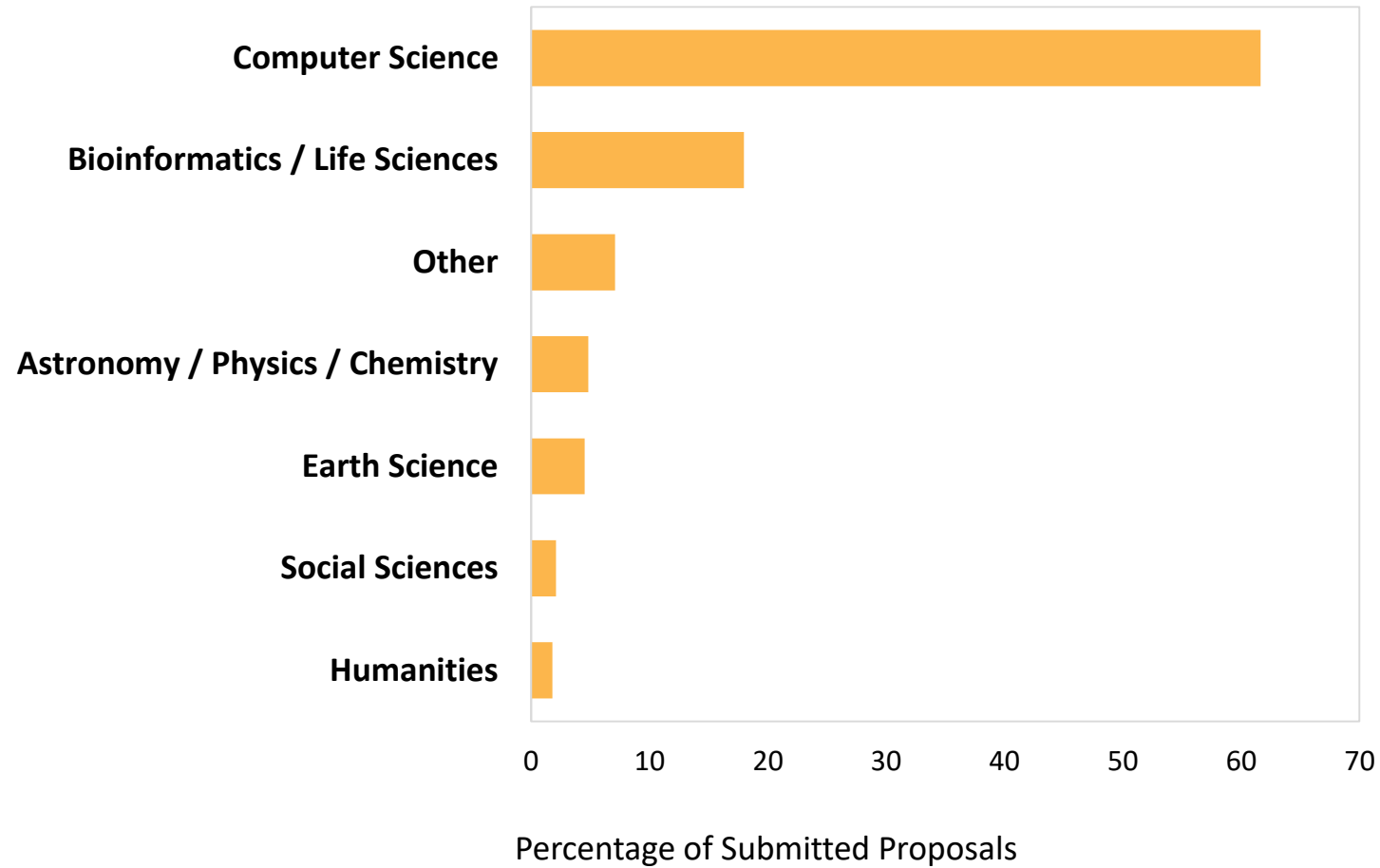
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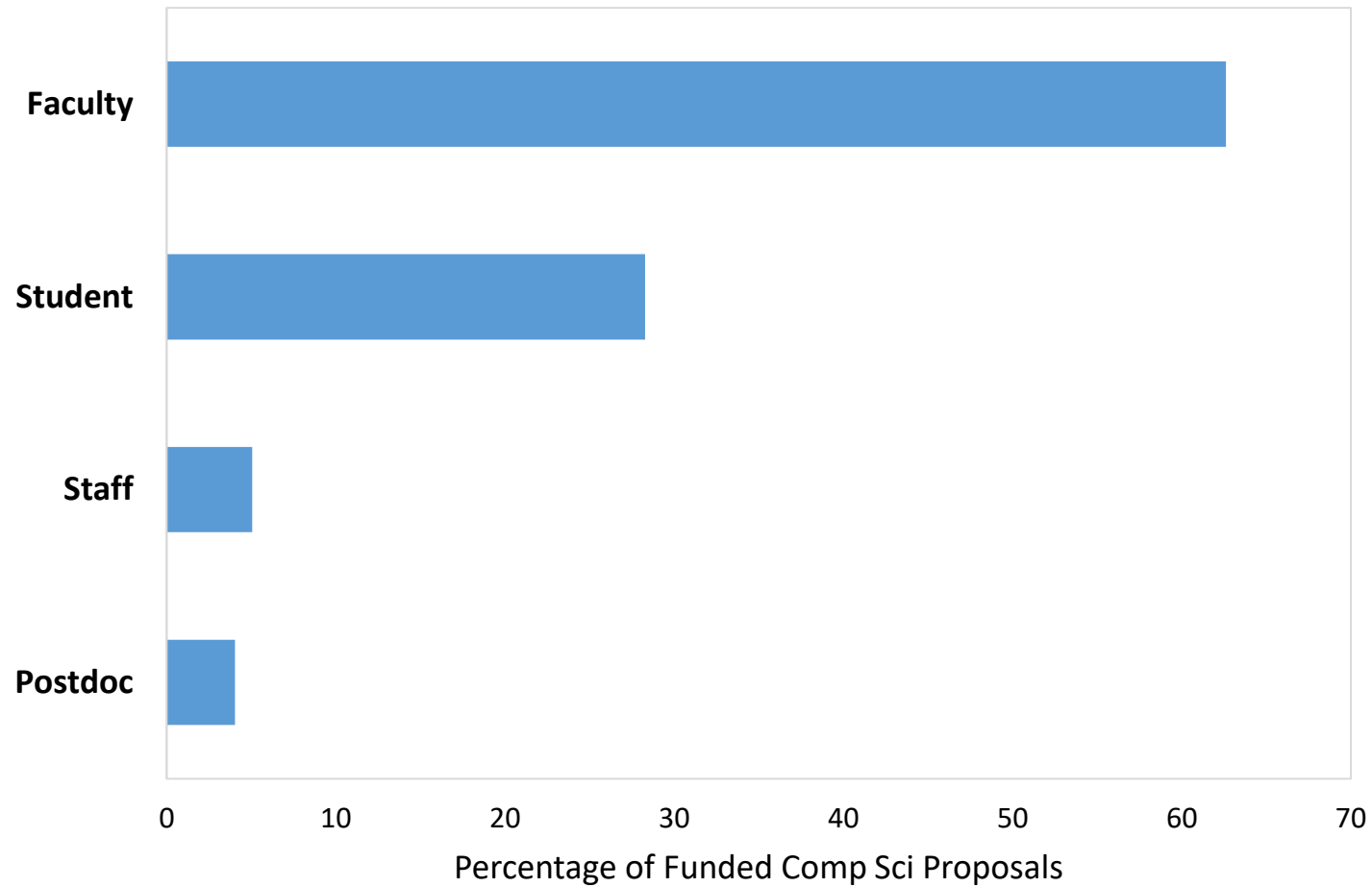
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# Researchers from all domains seek AWS support



# We support researchers at all career stages



# Frequently Asked Questions

## **For how long are the credits valid?**

Research credits expire after 1 year from the date of redemption.

## **What services are NOT covered by credits?**

Reserved Instance purchases, Mechanical Turk, Marketplace purchases, Business or Enterprise Support.

## **Can I apply for an extension or for additional credits?**

While credits are generally provided as a one-time support for a single project, we can evaluate additional support on individual bases.

# Application Cycles

Quarterly application deadlines.

Panel of reviewers across Amazon.

Historical funding line ~40% .

Notification of decisions occurs  
2-3 months following deadline.

Submission Date	Notification Date
January 1 - March 31	June
April 1 - June 30	September
July 1 - September 30	December
October 1 - December 31	March

# Public datasets on AWS

AWS hosts a selection of datasets that anyone can access for free



## **Life Sciences**

1000 Genomes Project  
The Cancer Genome Atlas  
Rice Genome



## **Earth Science**

Landsat  
NEXRAD



## **Machine Learning**

Common Crawl Corpus  
Multimedia Commons  
Computer Vision

<http://aws.amazon.com/public-data-sets/>



# Amazon Research Awards (ARA) program

<https://ara.amazon-ml.com/>

- **Call for Research Proposals**

- Amazon Research Awards (ARA) program for machine translation, computer vision, general AI, machine learning, and other.
- Combination of cash (up to \$80K) and AWS service credits
- Aims to support projects leading toward a Ph.D. degree or conducted as a part of post-doctoral work
- Full-time faculty members of institutions in North America and Europe granting PhD degrees in fields related to Machine Learning are eligible to apply.
- Applications submitted online at <https://ara.amazon-ml.com/proposals/#apply>. Next deadline: **September 2018**

# AWS Machine Learning Research Awards

<https://aws.amazon.com/aws-ml-research-awards/>

- The AWS Machine Learning Research Awards (MLRA) program funds eligible universities, faculty, PhD students and post-docs under the supervision of faculty, that are conducting novel research in machine learning (ML).
- For more information or to receive an application please contact [ml-research-awards@amazon.com](mailto:ml-research-awards@amazon.com)