Getting Access to NAIRR Pilot Resources

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Maytal Dahan, TACC

(Slides Developed By: Lauren Michael, Timothy Middelkoop, and David Hart)

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About Me

Maytal Dahan
maytal@tacc.utexas.edu
Director, Advanced Computing Interfaces
Texas Advanced Computing Center (TACC), UT Austin

Co-PI, SGX3 – NSF Center of Excellence for Science Gateways
Engaged in the NAIRR Pilot Coordination office and NAIRR Pilot Portal team

NAIRR **Pilot Program**

- Connects U.S. **researchers** and **educators** to computing capacity, tools, data, and training resources for AI development and application *https://nairrpilot.org/about*
  - resources include GPUs, training datasets, AI tokens and AI credits, across federally-funded and commercial providers.
- Multi-agency, public-private ***pilot*** coordinated by the NSF https://new.nsf.gov/focus-areas/artificial-intelligence/nairr
  - Task Force initiated 2020, Pilot launched 2024, operational by 2026
- Equitable access regardless of academic or non-profit organization size or type, funding sources, or academic domain of application.
- Subscribe to the NAIRR Pilot newsletter by clicking or scanning the QR Code

NAIRR Pilot Allocation **Eligibility & Requirements**

- Research or course must have an AI component.
- Principal Investigator / Lead Instructor and all other **users must perform work via an eligible organization physically based in the U.S**.
  - Other types of organizations, such as commercial entities, may be eligible
  - **U.S. citizenship is not required**, except for a few resources
- Use of requested resources must be completed within 12 months
- Research products must be made openly available.
- Principal Investigators (PIs) and Lead Instructors will be listed on the NAIRR Pilot website along with information about their allocation.

NAIRR Pilot **Focus Areas (Research)**

Focus areas:

- *Advancing AI methods that enable scientific discovery and improve AI interpretability, security and trust.*
- *Accelerating time to science and innovation through AI enabled automation, autonomy and novel design and control processes.*
- *Applying AI to use, share, or integrate sensitive data from multiple sources to enable new experimental methods and discovery.*
- *Advancing approaches for integrating simulations and AI.*
- *Creating or developing open-source AI tools, models, datasets, and methods.*
- *Training and educating the next generation AI-savvy workforce.*

Other projects that align with the broader objectives of the NAIRR Pilot, as well as projects in other areas of AI research and applications, may secondarily be considered for allocation. See website: https://nairrpilot.org/opportunities/allocations

NAIRR Pilot **Example Use Cases**

- Hands-on AI course requiring GPU resources for undergraduate or graduate students to develop and train models.
- Training AI models on large medical imaging datasets for disease detection.
- Evaluating and improving the use of LLMs for code synthesis.
- Benchmarking existing models for capabilities, security, and trust.
- Scaling up AI model training, including using simulation and synthetic data
- Use of novel AI hardware for training and inference.

nairrpilot.org/projects/awarded

Resource Awards

Filters

Field of Science

- [x] (Toggle All)
- [x] Agriculture, Forestry, and Fisheries
- [x] Applied Computer Science
- [x] Artificial Intelligence and Intelligent Systems
- [x] Astronomy and Planetary Sciences

Organization

Project Type

NAIRR Classroom

Resource

-- All --

(NAIRR240249) Building AI-enabled data visualization interfaces

Boettiger, Carl (University of California Berkeley)

Field of Science	Project Type	Dates
Ecology	NAIRR Classroom	2024-08-15 to 2025-08-14

Resources

Abstract

(NAIRR240301) Course on Deep Learning and Modern Applications

Tulabandhula, Theja (University of Illinois at Chicago)

Field of Science	Project Type	Dates
Computer Science	NAIRR Classroom	2024-10-21 to 2025-10-20

Resources

nairrpilot.org/opportunities/allocations

Available Resources

The set of resources available through the NAIRR Pilot has been expanded to include additional resources funded by federal agencies as well as resources contributed by private and non-profit sector partners. Over time, we expect new resources will be added to the NAIRR Pilot, and some resources may be removed from the pilot as their available contributions are committed to projects.

Researchers are strongly encouraged to review the most up-to-date list of resources, which will always be available via the NAIRR Pilot Resource Catalog.

Filters

AI Capabilities

- [ ] Model inference services
- [ ] Model training services (GPU)
- [ ] Model training services (non-GPU)
- [ ] Research Collaboration
- [ ] AI tools and support

Resource Category

- [ ] Federal agency systems
- [ ] Private sector computational resource
- [ ] Private sector model access
- [ ] Other private sector contribution
- [ ] Classroom Platform

Resource Type

- [ ] Cloud
- [ ] GPU Compute

Resources

Amazon Web Services

Anthropic Model API

Cerebras Wafer-Scale Engine 2 (CS-2) AI Accelerator

Chameleon

Resource Type:	Cloud Platform
Organization:	University of Chicago
Units:	SUs
User Guide:	Link to User Guide
Features Available:	• Cloud

NAIRR Pilot - Private Sector Resources

These resources represent leading-edge offerings from corporate and non-profit organizations. So new we're still trying to decide how to classify them.

Cloud Providers

IBM & Partners

Microsoft Azure

Voltage Park

On Pause

NVIDIA DGX Cloud

Amazon Web Services

Google Cloud Platform

Training Hardware

Cerebras CS-2

Inference/Model Services

Anthropic

Groq LPU Inference Engine

OpenAI

SambaCloud

Tools and Software

DataBricks

Eleuther AI

Hugging Face

Lexset Seahaven

OpenMined

Weights & Biases

nairrpilot.org > Current Opportunities

NAIRR Pilot - GPU and CPU Resources (federally supported)

These resources comprise mostly homogeneous partitions or are dominated by a single processor type. The number and types of hardware vary from resource to resource.

NVIDIA V100

PSC Bridges-2 GPU
264 V100s

SDSC Expanse GPU
208 V100s

NVIDIA RTX-5000

TACC Frontera GPU
360 RTX-5000s

NVIDIA A100 / A40

NCSA Delta GPU
400 A100s & 400 A40s

Purdue Anvil GPU
64 A100s

TACC Lonestar-6 GPU
48 A100s

NVIDIA H100 / Grace Hopper

NCSA DeltaAI
456 H100s

SDSC Expanse AI
136 H100s

PSC Bridges-2 GPU
80 H100s

TACC Vista
608 GH H100s

Purdue Anvil AI
80 H100s

AMD Milan
Purdue Anvil CPU
TACC Lonestar-6

AMD Rome
PSC Bridges-2 CPU
SDSC Expanse CPU

Intel Cascade Lake
TACC Frontera

Large-Memory Nodes
PSC Bridges-2 EM
(Extreme Memory)

nairrpilot.org > Current Opportunities

NAIRR Pilot - AI and Other Resources (federally supported)

The NAIRR Pilot includes resources that offer alternative architectures designed to support a wide range of needs beyond the more conventional HPC architectures.

AI Accelerators

PSC Neocortex
Two Cerebras CS-2 systems

SDSC Voyager
42 8x Intel Habana Gaudi training nodes

DOE ANL AI Testbed
four different architectures
- Cerebras CS-2
- SambaNova DataScale SN30
- Graphcore Bow Pod 64
- Groq LPU Inference Engine

Cloud

Indiana Jetstream-2 GPU
360 A100 GPUs

NEW!
Chameleon
Heterogeneous bare-metal cloud

Composable & Distributed

Texas A&M U ACES
composable system with a wide range of processor and accelerator options

FABRIC
distributed compute / network platform

Edge Computing

SAGE
AI @ Edge infrastructure

High-Throughput Computing

PATh Collaborations
Partnership to Advance Throughput Computing — 32+ A100 GPUs

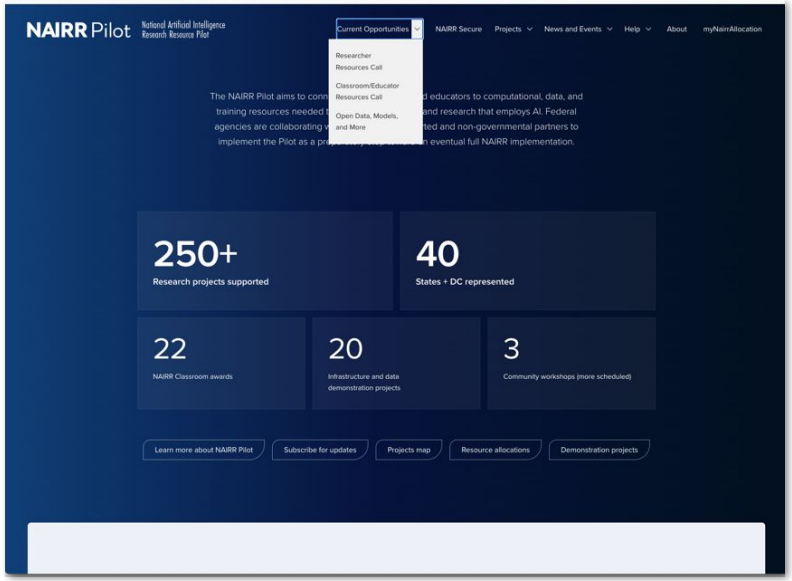
Specialized Environment

NSDS Secure Compute Environment NEW!
Secure enclave for privacy-preserving statistical analysis of Federal data

nairrpilot.org > **Current Opportunities**

Allocations in the NAIRR Pilot

- Visit https://nairrpilot.org
- Look under “Current Opportunities”
- We now have four project options
  - **Research Resources** — The original “NAIRR Pilot” opportunity, appropriate for most research activities
  - **Educational Resources** — a.k.a. “NAIRR Classroom,” for courses and training activities on a targeted set of resources
  - **Start-Up Projects** — Best for getting started, especially if you have limited access to resources to prepare a larger request
  - **Deep Partnerships** — Unique opportunity for close collaborations with selected resource providers and specialized offerings



nairrpilot.org > **Current Opportunities**

Slide courtesy of Dave Hart, NAIRR Pilot Allocations

NAIRR Pilot **Deep Partnerships**

- *Several industry partners are interested in engaging interactively and collaboratively on selected research projects…*
- Potential project areas, partnership expectations, durations, submission deadlines, and review timelines vary for each Partnership Opportunity.
- Proposer eligibility, overall project expectations, and proposal instructions are similar to the Research Resources opportunity.
- See the Deep Partnerships web page for available partnerships and complete expectations, eligibility and other requirements: https://nairrpilot.org/opportunities/deep-partnerships

NAIRR Pilot **Allocation Process**

1. **Proposals accepted at any time** (<3 pages)
2. **Proposals peer-reviewed approximately monthly**
   - soft deadline: 15th of the month
   - 2+ reviewers per proposal, per request size/complexity
3. **Selected proposals matched to resources.**
   - Matching committee includes reps from every resource-provider.
   - Proposers requesting only gov-funded resources can ask to be invisible to non-gov partners.
   - Matching may adjust the requested quantity or resource(s), per reviewer suggestions and/or resource availability.
4. **Selected awards notified.** (within 3 months)
5. **Resource onboarding between NAIRR Pilot Resource and Proposer.** (1-3 weeks)
6. **PIs provide required reports on progress.**

https://nairrpilot.org/opportunities/allocations https://nairrpilot.org/reporting-guidance

NAIRR Pilot **Proposal Instructions**

- **Follow instructions:** https://nairrpilot.org/nairr-pilot-proposal-instructions
- Proposals are a request for access to computational and data resources, and is not a typical research proposal.
- Submit when you are **ready to immediately use the requested resources**.

Watch "Requesting Resources via the National AI Research Resource Pilot" video for additional guidance.

NAIRR Pilot **Project Description** Outline

To ensure your request can be properly reviewed and projects are directed to the appropriate resource(s), your description should include the sections outlined here.[1]

A. Scientific/Technical Goal
- scientific and methodological basis , focus area alignment, overall plan

B. Estimate of Compute, Storage and Other Resources
- computational approach, specific need for NAIRR Pilot resources, and detailed quantification

C. Support Needs
- software/environment requirements and setup experience, restrictions on code, data, etc.

D. Team and Team Preparedness
- roles and experience relevant to the approach and requested resources

[1] https://nairrpilot.org/nairr-pilot-proposal-instructions

NAIRR Pilot **Review Criteria: Research**

- ***Alignment*** *with the NAIRR Pilot focus areas*[1]
- ***Project readiness*** *and potential for near-term progress*[1]
- ***Feasibility*** *of the technical approach*[1]
- ***Need*** *for the computing, support, or other resources available via* ***the NAIRR Pilot***[1]
- ***Knowledge and experience of the proposing team*** *related to the proposed work*[1]
- ***Estimated resource requirements*** *and* ***justification***[1]

[1] https://nairrpilot.org/opportunities/allocations

Proposal Components: **Scientific/Technical Goal**

(roughly 1+ page)

- **scientific and methodological basis, and goals**
  - with citations of any relevant prior work and/or peer review
  - including any funding for the proposed effort (grant, institutional, etc.)
- **alignment with NAIRR Pilot Focus Areas**
- **overall plan and timetable for achieving goals**
- **public dissemination plan** (see requirements)

[1] https://nairrpilot.org/opportunities/allocations
[2] https://nairrpilot.org/nairr-pilot-proposal-instructions

Proposal Components: **Estimate of Compute, Storage and Other Resources**

(roughly 1 page)

- **computational approach in relation to the research objectives**
  - execution approach across project phases, experiments, and/or tasks
  - required models, user environment, software, datasets, parallelism / distribution approach, and the plan for accessing and/or implementing these
- **detailed resource calculation, in resource-relevant units**

  (e.g. GPU or node hours, terabytes of storage, tokens, credits, and/or U.S. dollars)
  - *how you determined values from prior work by the team or by others* (see also: Start-Up requests)
  - total concurrent data storage needs in terms of inputs and outputs, including intermediate data, logs, etc.

[1] https://nairrpilot.org/opportunities/allocations
[2] https://nairrpilot.org/nairr-pilot-proposal-instructions

Proposal Components: **Support Needs**

- **requested support in relation to the computational approach**
  - whether Resource Provider support staff will be essential, helpful or unnecessary, and for what needs
  - relevant access restrictions for the project, such as export-controlled code, ITAR restrictions, proprietary datasets or outputs, or personal health information (PHI) or HIPAA considerations
- ***if requesting research collaboration as offered by some resource providers***, describe how your project is suited to and would benefit from the collaboration

[1] https://nairrpilot.org/opportunities/allocations
[2] https://nairrpilot.org/nairr-pilot-proposal-instructions

Proposal Components: **Team and Team Preparedness**

- **timeline and readiness for beginning the proposed use of resources**
- **list of ALL team members (including students)**
  - names, titles, affiliations, and project roles informing resource access
  - citizenship required for some access-restricted federal facilities
- **team and/or individual expertise and experience**
  - relevant to the proposed methodologies, computational tasks, and resources
  - the above do not require a lengthy list of accolades and achievements

NAIRR Pilot ***Common Proposal Pitfalls***

- Failure to follow the Proposal Guidance on formatting, outline, etc.
- Including references in the main proposal instead of the supplemental doc.
- Failure to demonstrate the scientific merit and/or prior review for the proposed methodology or course.
- **Failure to <u>connect resource requests to the described computational approach</u> (show your math!).**
- **Failure to <u>demonstrate feasibility and readiness for the proposed scale</u>** (does the research team have demonstrated experience at similar scales).
- Failure to write a **resource allocation request** by using grant proposal language (this is a resource request with a **different audience**).

NAIRR Pilot Classroom/Educator Resources Opportunity

nairrpilot.org/opportunities/education-call

Eligibility

This call is open to proposals by US based educators and researchers who are teaching undergraduate or graduate courses or shorter duration training sessions to US based students that include subject matter in artificial intelligence and require that students use advanced computational resources as part of their coursework. Courses from any discipline are eligible for this program. Courses and training sessions must not allow participants who are not US based.

Available Resources

Filters

AI Capabilities

- [ ] Model inference services
- [ ] Model training services (GPU)
- [ ] AI tools and support

Resource Category

- [ ] Federal agency systems
- [ ] Other private sector contribution
- [ ] Classroom Platform

Resources

- Indiana Jetstream2 GPU
- NIH Cloud Lab
- Prototype National Research Platform (PNRP) Classroom
- Vocareum AI Notebook

NAIRR Pilot **Classroom/Educator Resources Opportunity**

Allocation Eligibility and Requirements – https://nairrpilot.org/opportunities/education-call

- Open to AI-relevant, US-based undergraduate and graduate courses, and short-form training.
  - All involved educators and learners must be physically based in the U.S.
- All primary educators and teaching assistants will be added to a NAIRR Pilot chat channel to foster community.
- Proposers must submit using their institutional (e.g. .edu) email address.

Proposal Instructions – https://nairrpilot.org/opportunities/education-call

- Proposal and allocation process / timeline similar to the Research opportunity.
- Online submissions form and 3-page Project Description with required outline.
- Supporting Documents (CV; team members/collaborators including TAs; references)

NAIRR Pilot **Review Criteria: Classroom/Educator**

- ***Alignment*** *with the educational and workforce development focus.*
- ***Readiness of the planned course****, including institutional support commensurate with what is proposed. The resources offered assume that an instructor, teaching assistant, or other person will be the primary source of technical support for students accessing and using the resources.*
- ***Match of request*** *to the resources offered.*

Resource requests should be based upon tests of same/similar resources by the instruction team. Check *Resource Descriptions* for details on resource units and calculation (e.g. units of computing resource, number of students, etc.).

https://nairrpilot.org/opportunities/education-call

NAIRR Pilot **Project Description** Outline

To ensure your request can be properly reviewed and projects are directed to the appropriate resource(s), your description should include the sections outlined here.

A. Course Description
- course objectives, target learners, format, timing, resource utilization plan

B. Estimate of Compute, Storage and Other Resources
- computational approach, per-student and course-wide resource quantification

C. Support Needs
- software/environment requirements and setup experience, restrictions on code, data, etc.

D. Team and Team Preparedness
- roles and experience relevant to the course content and requested resources; citizenship

https://nairrpilot.org/opportunities/education-call

NAIRR Pilot **Classroom/Education Example**

- The class CS4281 “[title]” requires access to 150 Jupyter Notebooks for approximately 6 hours a week for 18 weeks per student for a total of 16,200 hours. For regular course material, only CPU notebooks are required on a system with 8GB of RAM, 4 cores, and with 10GB of storage per student. Additionally, students will have a final project that will require 10 hours a week for 2 weeks utilizing a large GPU (50% of a A100 or greater) for a total of 3,000 GPU hours. No additional storage is required. Support will be required to add GPU resources to notebooks.

Students	Weeks	Hours/Week	Resource	Total Hours	SU Size/Units	SU’s
150	18	6	Vocareum AI Notebook	16,200	Students	150
150	2	10	Jetstream2 GPU	3,000	32 (g3.large)	96,000

Start-Up Opportunity

Resource Testing and the **Start-Up Opportunity**

Concretely demonstrate aspects of **feasibility**, **project readiness**, and **need for resources** by first testing your computational work!

- Test on the same or similar resources and track costs/usage.
- Test a series of computations that use variously-sized subsets of data, parameters, tokens, or other components, to extrapolate your full-scale needs.
- Test for each method, project phase, and/or computation type.

A NAIRR Pilot Start-Up Allocation is now available [NEW!]
https://nairrpilot.org/opportunities/startup-project

- For shorter projects (up to 3 months) using one resource.
- Get acquainted with a resource, build your execution environment, scale-test and/or benchmark.
- Online form and **optional** 1-page document reviewed within 2 weeks.

Other Relevant Computing Resources

Government-Funded Resources
vary in eligibility based upon scholarly domain/mission, and/or funding from the same agency

- **NSF ACCESS Program** https://allocations.access-ci.org/ (prior funding not required)
  - allocates NSF-funded computing resources (including some NAIRR Pilot resources)
- **NSF Partnership to Advance Throughput Computing (PATh)** https://path-cc.io/
  - high-throughput computing and data sharing resources; some require funding and/or application
- **NIH Cloud Lab** https://cloud.nih.gov/resources/cloudlab/
- DOE Leadership Computing Facilities
  - **Argonne Leadership Computing Facility (ALCF) AI Testbed** https://www.alcf.anl.gov/alcf-ai-testbed
  - **National Energy Research Scientific Computing Center (NERSC)** https://www.nersc.gov/
  - **Oak Ridge Leadership Computing Facility (OLCF)** https://www.olcf.ornl.gov/

Commercially-Available Resources

- Most have no-charge, quick options for modest research and education purposes, and/or testing.

Getting Help

- NAIRR Pilot Website https://nairrpilot.org/
  - The Resource Opportunities provide lists of resources, documentation, and proposal instructions.
  - The Previous Awards page provides information on what projects and resources have been awarded.
- Read the Frequently Asked Questions https://nairrpilot.org/help/faq
- Check the Events and Training page for this and other training events and office hours
  - https://nairrpilot.org/pilotevents
- **Attend the NAIRR Pilot Office Hours**
  - Currently 2nd Tuesday of every month, 12 PM PT/3 PM ET – check the NAIRR website for registration
- **Submit a NAIRR Pilot Ticket**
  - On the NAIRR Pilot website, navigate to “Help” and “Submit a Ticket”, or visit
  - https://nairrpilot.org/open-support-request

Wrap Up

- This is a resource-request proposal, not a research or classroom proposal. Follow the instructions, and adjust appropriately.
- Demonstrate that you are immediately able to start using the resources.
- Provide detailed justifications and calculations for your resource request.
- Show your calculations.
- Ask for help, leverage office hours.