



Impact of Penn State's RISE Team on Research

Chuck Pavloski, Ph.D.

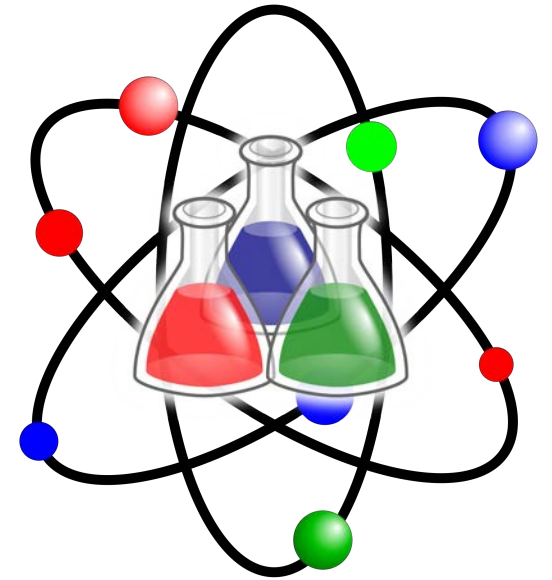
RISE Team Lead - chuckp@psu.edu

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5 – 8 December 2022





"So, tell me what you do?"





Who are the RISE Team?

<https://icds.psu.edu/computing-services/rise/>

RISE = "Research Innovations with Scientists and Engineers"

ICDS domain scientists and software engineers who connect PSU research to appropriate computational resources.





Talk Outline

The Case for the RISE Team

**Creating, Growing and Retaining the
RISE Team**

Seed Grants

Results and Impact

The Path Forward





DISCLAIMER





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Institute for Computational
and Data Sciences

The Case for the RISE Team





Determining The Need (2019)

The computational demands required by scientific research continue to grow

The demand for STEM domain specialists with advanced computational skills is very high

Educating the research community on what is possible





Reaching out to our researchers

Faculty-driven oversight committees

Desired skills and disciplines addressed

Sharing of these specialists among researchers at large institutions provides a career path for the non-traditional scientist

Providing help with proposals via seed projects and data visualizations





Determining the research support needs

35 co-hires surveyed

Metric	Result
Average annual co-hire external funding (self-reported)	\$400,000
Average fraction of funding that requires developing research cyberinfrastructure	36%
Fraction of co-hires with long-term research cyberinfrastructure commitments	64%
Fraction of co-hires satisfied with PSU computing facilities	64%
Fraction of co-hires satisfied with abundance of CI staff to facilitate research	27%
Fraction who feels they would be more productive with additional facilitators	91%
Median/Average annual FTE which could be utilized by each co-hire	0.2/0.38





What does RISE do for PSU Research?

RISE consultants have expertise in an impressive array of programming methods, computational methods, scientific fields, and much more. RISE engineers can help with problems such as:

- Programming Methods
- Databases
- Base Systems
- System Profiling / Performance Testing
- Application Support
- AI, ML & DL Utilities/Software
- Science Gateways & Web Services
- Scientific Fields
- Computational Methods
- Visualization and Immersive Experiences





Creating, Growing and Retaining the RISE Team





The Ideal RISE Candidate



M.S. / Ph.D. level researcher with STEM domain knowledge

Demonstrated advanced computational skills (RSE, RCD, etc.)

Demonstrated desire to expand scientific experience beyond their domain

Career scientists who want to remain in the academic domain but prefer not to follow the traditional paths





Creating the RISE Team



Career path for RISE engineers as staff scientists

Professional development and state of the art tools empowers a strong, self-motivated team.

Opportunities to teach and provide advanced training





Building the RISE Team

RISE members are stable, university staff positions

Typically, RISE members have two to four concurrent, externally paid projects

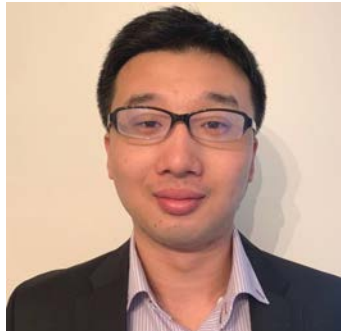
More RISE positions to be advertised for hire as demand continues to grow



RISE Team Members



Carrie Brown
ACI-REF
Research Facilitation



Dr. Weinan Chen
RISE Engineer
Materials Science



Clayton Colson
Immersive Experiences



Dr. Simon Delattre
RISE Engineer
Machine Learning



Dr. Patrick Dudas
Interim CIE Director
Data Visualization



Dave McLaughlin
RISE Engineer
Data Visualization



Diego Menendez
RISE Engineer
Software Engineering



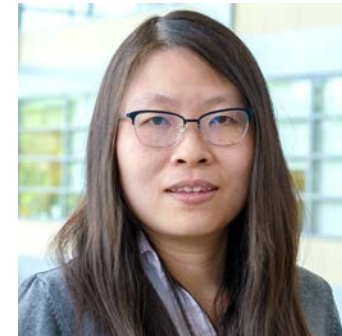
Jeff Nucciarone
RISE Engineer
Parallelization



Dr. Chuck Pavloski
RISE Team Lead
Earth Sciences



Dr. Justin Petucci
RISE Engineer
Machine Learning



Dr. Danying Shao
RISE Engineer
Computational Biology



Ron Tapia
RISE Engineer
Platform Computing





RISE Subteams

RISE AI/ML/DL Team

RISE Visualization and Immersive Experiences Team

RISE Software Engineering Team (RSEs)

RISE HPC / HTC Team (Swiss Army Knives)





RISE Service Level Agreements (SLAs)

SLAs form the basis for RISE engagements

SLAs define the costs, goals, timelines and workload estimates

SLAs provide both the client and RISE member clear targets

SLAs RISE rates are determined through our Research Office





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RISE Seed Grant Programs





Why Seed Grants?

Promoting innovation and new research

Provides insight for future RISE hiring skills

Provides insights to the sponsoring program or institute

Low risk, high reward and RISE member job diversity





RISE CC* Seed Grant Program



RISE currently has a National Science Foundation sponsored program to provide up to 300 hours of RISE team member support for small projects.

This is an ongoing call for proposals which is reviewed quarterly by ICDS.

Special consideration is given to faculty who are from Commonwealth Campuses outside University Park and D.E.I. applicants

<https://www.icds.psu.edu/computing-services/rise/apply-for-a-rise-seed-grant/>

NSF Grant - OAC-2018299





Other RISE Seed Programs ...

RISE-SAFES (PSU Institute for Sustainable Agricultural, Food, and Environmental Science) - 6 Grants, 1200 Hours

RISE-IEE (PSU Institute for Energy and the Environment) - 2 Grants, 450 Hours

Non-ICDS units are using the Seed Grant model for RISE engagement





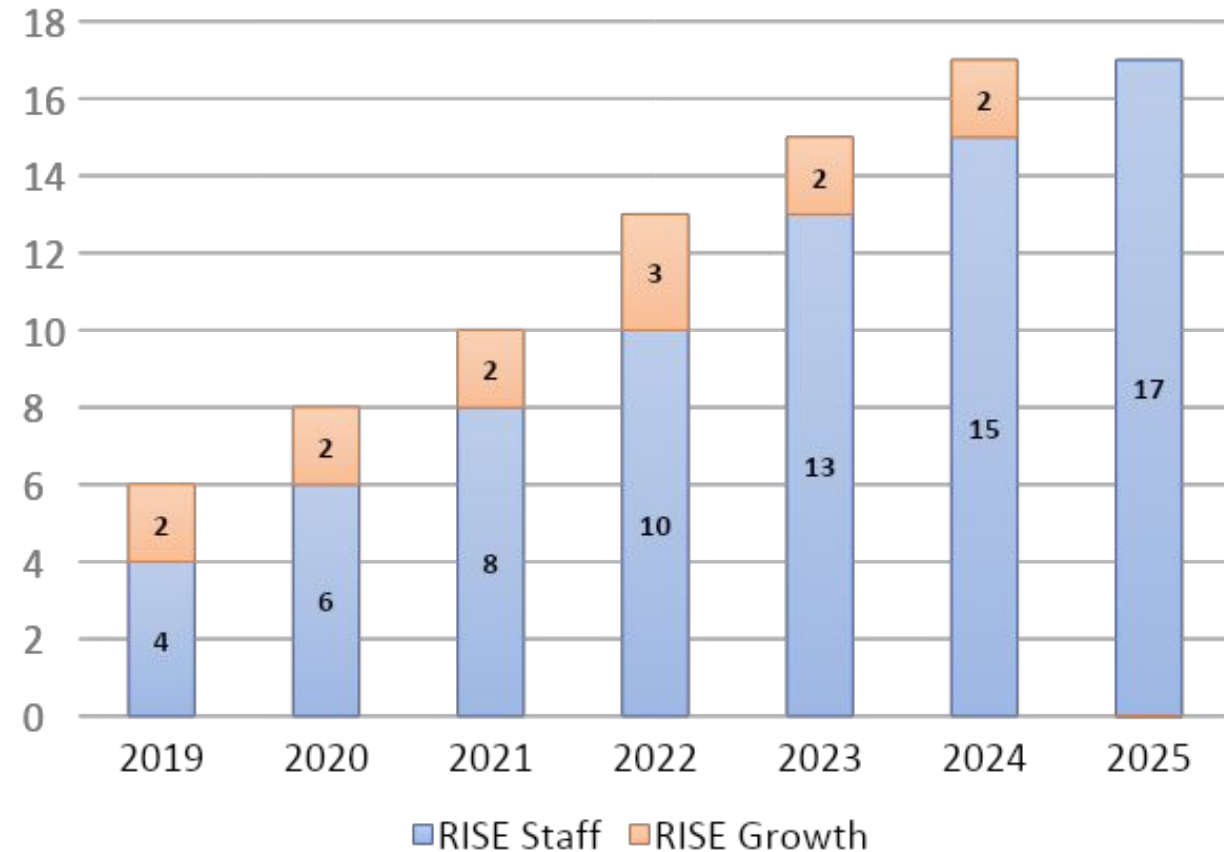
Getting Results



SUCCESS of RISE

- Over 35 external and internal active RISE projects
- 80-90% project-allocated
- Co-author, acknowledgement in publications and grants
- Support of multi-institution programs such as LIGO and SCIMMA

RISE Team Growth - Past and Projected



RISE Success Stories (2020-22)

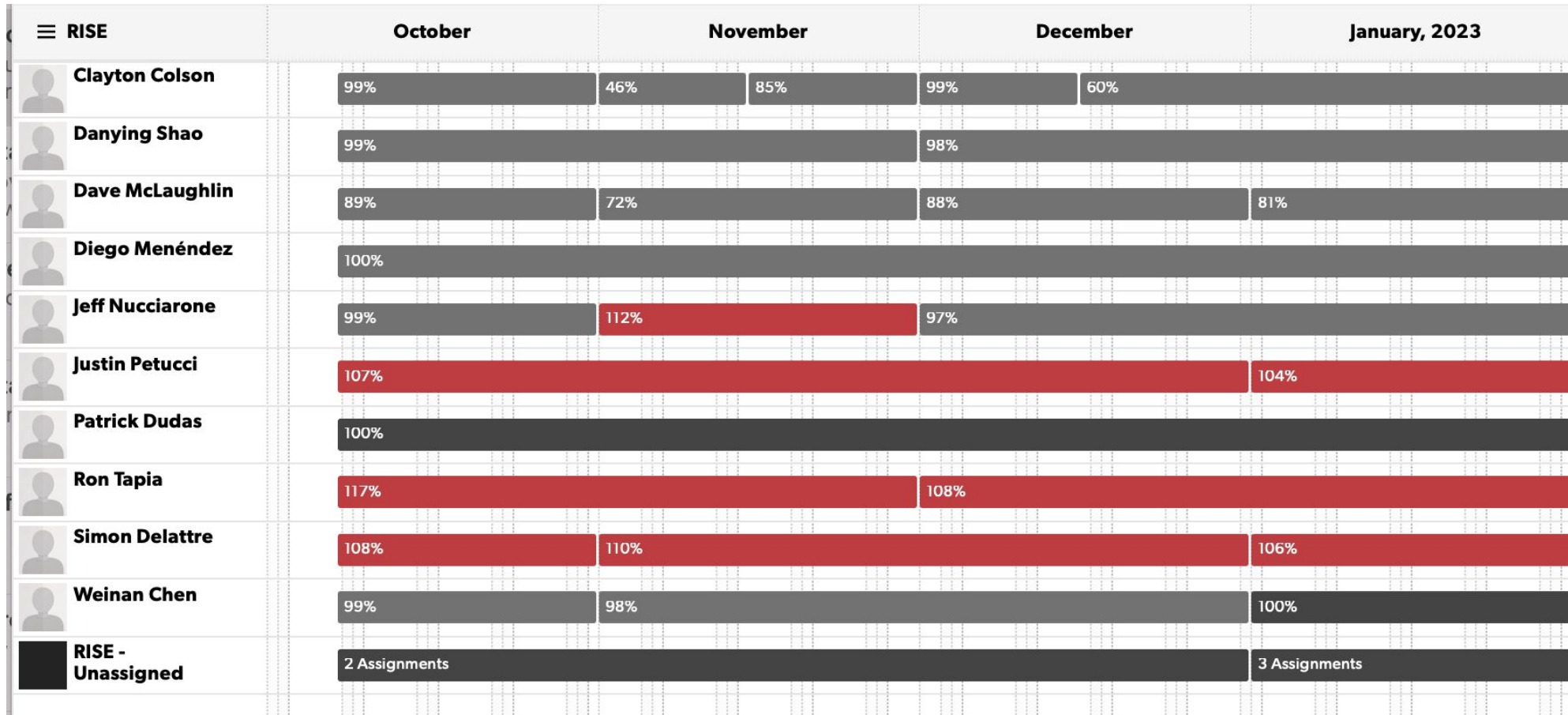
- Dr. Shanbhag – **ARPA-E Project** - (*Weinen Chen, Justin Petucci, Danying Shao*)
- Drs. Silverman and Ferrari – **COVID Gateway Project** - (*Danying Shao, Chuck Pavloski*)
- Drs. Pugh and Mahony – **Chip-EXO (Galaxy) Project** - (*Danying Shao, Chuck Pavloski*)
- Drs. Leichty and Cheng – **Geometry of Life Project** - (*Diego Menendez*)
- Dr. Hanna – **LIGO and SCIMMA** - (*Ron Tapia*)
- Dr. Honavar - **CTSI Electronic Medical Records ML Project** - (*Justin Petucci*)
- Dr. O'Brien - **Protein Translation ML Project** - (*Justin Petucci, Danying Shao*)
- Dr. Fisher-Vanden – **Program on Coupled Human and Earth Systems (PCHES) Project** - (*Jeff Nucciarone*)
- Dr. Tehranchi - **Cognitive Models in the Capture-the-Flag Game** - (*Dave McLaughlin, Anudha Mittal*)
- Dr. Konak - **Predicting Wireless Signal Penetration using Deep Learning** - (*Simon Delattre*)

And many more projects through various funding sources





RISE Utilization





Seed Grant Metrics (7/20 - 12/20)

Total RISE CC* hours awarded - 4790 hours

Total number of awards – 22

**Non-University Park campuses
represented – 7**





Seed Grant Impacts on Research

Three fully-funded follow-on grants to date
(of 12 finished seed grants)

Multiple proposals submitted awaiting review

Relationship building resulting in post-seed grant involvement
on other research projects





RISE Impact through Dec 2022

Total RISE hours assigned – over 28000 hours / 3 years

Average of ~6 FTE over that period fully committed

Total number of projects – 78

Number of PSU campuses represented – 8 (of 22)





RISE Workforce Environment

RISE members research workload:

~ 85% of their time on funded research projects or seed grants

Time for professional development and the unexpected

This balance creates a solid, reasonable work environment

Increased RISE member satisfaction and employee retention





Impacts on Workforce Development

COVID brought on its own challenges

We have embraced both remote and hybrid work

Expanded our pool of potential engineers for hire via student pipelines (graduate student appointments)





Impacts on Workforce Development

RISE staff are highly effective using the SLA work model

We have embraced the mentor-mentee relationship between senior and junior engineers

A unique sense of culture is forming among the RISE team

Three RISE members are Campus Champions





The Path Forward ...

Defining a longer-term career path for these engineers

Developing workforce development pipelines

Developing networks of similar engineers / scientists doing RISE work

Working with External Partners

Collaborations, Collaborations, Collaborations!!!





Thank you!

Questions?

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