Position Specification

Pittsburgh Supercomputing Center
Director

Private and Confidential

Russell Reynolds ASSOCIATES

The Role

Pittsburgh Supercomputing Center (PSC) is a national leader in large-scale computing and has had a long and successful 36-year history. PSC is a joint computational research center at Carnegie Mellon University (CMU) and the University of Pittsburgh (Pitt) providing high-performance computing, communications, and data-handling for unclassified research to university, government, and industrial researchers. Both universities have invested in the Center and are committed to its continued success since it is integral to key growth strategies at both institutions. Further, PSC operates in a unique environment both as part of two AAU universities with more than $1.25B of combined research expenditures, and within the growing tech economy in Pittsburgh.

PSC seeks a strategic and visionary Director who will capitalize on these assets and move the organization to the next level. The Director will have the support of both universities to execute a bold vision, as PSC is a key element in their future strategic directions. The successful candidate will work collaboratively and effectively with current PSC staff, with leaders across both Pitt and CMU campuses, and with commonwealth and federal agencies, corporate partners, and international affiliates to set the strategic goals and vision of the Center. They will plan and direct the deployment of a new generation of large-scale computing and cyberinfrastructure in a rapidly changing landscape of heterogeneous computing technologies, distributed resources, and commercial "big data" platforms.

The Director will provide overall leadership for the Center, ensuring PSC's position as a leader in the development and implementation of advanced cyberinfrastructure. They will lead the Center's efforts to support the advancement of science, engineering, medicine, social sciences, humanities, and other disciplines that are dependent on advanced computing technologies for progress. The Director will seek new research and education opportunities and will sustain and build external funding support from federal and state agencies, as well as corporate and private sponsors. They also will be responsible for recruiting and hiring a diverse management and senior staff in the Center; managing the Center's physical and financial assets; representing the Center locally, nationally and internationally; inspiring and motivating the Center's leadership team and staff; contributing to the strong Pitt/CMU traditions of interdisciplinary interactions and creativity; supporting collaborative efforts across STEM, medicine, humanities, and social science domains; encouraging economic development by promoting partnerships with the public and private sectors; and contributing to the long term agendas of federal funding agencies in relevant areas. The Director will report jointly to the Senior Vice Chancellor for Research at Pitt, and the Dean of the Mellon College of Science at CMU.

The Director should have demonstrated leadership and management experience in high-performance computing, networking, and cyberinfrastructure initiatives, as well as a clear understanding of the emerging landscape of heterogeneous commercial computing platforms (e.g., cloud). Experience in academic administration is highly desirable. The successful candidate will likely hold a doctoral degree and have an academic track record which could be appropriate for appointment as a tenured full professor at Pitt and/or CMU. Candidates with commensurately significant qualifications in the fields such as high-performance computing, big data, or data science, are also encouraged to apply. The salary is competitive and negotiable.

Core Responsibilities of the Director

This position is responsible for fulfilling and galvanizing PSC's core mission of providing high-performance computing and other resources and expertise to the national and local research community; for establishing a vision for PSC's future; and for creating a sustainable long-term plan for the Center. Such a vision will include creative ways to support the ever-increasing and changing requirements for research computing and data management, and strategies to navigate the complex funding landscape by securing and diversifying funding and partners.

As the leader of PSC, the Director will work with leadership at the Center to hire and retain staff in an increasingly competitive local and national environment. The Director also must effectively communicate, particularly to those outside of academia, the tangible benefits to the public at large of PSC's location in Pittsburgh and the Commonwealth of Pennsylvania. Since PSC is a joint research center between Carnegie Mellon and the University of Pittsburgh, the Director must successfully integrate the Center with cutting-edge research, scholarship, and educational missions of both universities, as well as foster partnerships, raise the visibility of PSC on both campuses, and engage in developing the research computing strategies at both universities and in western Pennsylvania more broadly.

Candidate Profile

The PSC Director will be an outstanding leader, effective at creating and articulating an inspiring vision for the Center. This individual will have a successful track record of identifying ideas and areas in which high-performance computing has transformative potential and of cultivating funders and partners from a variety of sectors. They will bring an entrepreneurial and creative approach to developing innovative ideas that will stretch the organization and push boundaries within the supercomputing space.

The Director must balance the needs of the national research community with those of the local campuses. The ideal candidate will understand the needs of academic users and will have experience directing centers with research and educational missions. They will easily connect with a wide variety of diverse individuals and will have the ability to build strong relationships with others, demonstrating high emotional intelligence. The ability to communicate effectively and persuasively across a diverse set of audiences is critical.

The Director will lead by example and drive the organization's performance with an attitude of continuous improvement by being open to feedback and self-improvement. They will effectively balance the desire and need for broad change with an understanding of how much change the organization is capable of handling and be able to create realistic goals and implementation plans that are achievable and successful.

The Director will bring a successful track record of fundraising via national grantmaking agencies. In addition, they will have proven leadership experience expanding funding sources and a vision for how the PSC can secure alternative resources at the local, state, and national levels.

In terms of the performance and personal competencies required for the position, the following are important:

- **Strategy, Vision and Execution**: This individual will utilize a range of sources, including experts and colleagues both at PSC and throughout the academic computing community, to create a clear vision for the Center. They must understand the breadth of science being carried out at PSC and have respect for the diverse disciplinary base of its users. They must have the ability to identify synergies across these subject areas. They will be an effective leader in the development and implementation of strategies to execute this vision.
- **Communication**: The ideal candidate will be an effective communicator and will be able to build momentum behind a vision, articulating the value of PSC and the impact it has on the national research and education community. They will establish and maintain working relationships with the divisions and directorates within funding agencies, with vendors of computational technologies, and with the leadership at both CMU and Pitt.
- **Leadership**: The successful candidate must earn the trust and confidence of PSC's long-tenured, passionate staff. They must have the ability to attract, recruit, and retain top talent, motivate the team, delegate

effectively, celebrate diversity, and manage performance. They should be widely viewed as a strong developer of others.

- **Technical Skills**: The successful candidate will understand the spectrum of cyberinfrastructure, from desktop to supercomputer, and collaboration in support of scientists. They will have the flexibility to deploy alternative architectures, practices, and paradigms, and change course as the needs of the research community (whether local or national) demand. This will require a broad and deep knowledge of science or engineering, together with hardware and software computational technologies, as well as a keen awareness of emerging trends in the field. In addition, the critical importance of data management and protection to world-class research at PSC must be top-of-mind for the individual with particular attention to the updated NIH and NSF policy standards.
- **Recognition**: The ideal candidate will be respected in both the national cyberinfrastructure and computational science communities, with a strong understanding of technology and research needs. This person will bring a constant desire to innovate and will be a steadfast champion for advancing the mission and the community as a whole. This individual should have a demonstrated record of working with administrative officials at universities and collaborators in large-scale national projects to successfully implement strategic initiatives and execute projects. They should be a natural bridge builder between PSC's constituencies.

About the Pittsburgh Supercomputing Center

PSC originated in 1986 from a successful National Science Foundation (NSF) solicitation response by Mike Levine (CMU), Ralph Roskies (Pitt), and Jim Kasdorf (Westinghouse), to create high-performance computing centers and enhance access to such computing resources for the U.S. academic and research community. A decade later, NSF moved to more targeted grants – separating hardware acquisitions, user support, and software developments – to which PSC responded by broadening its base of support. Presently, PSC has 32 grants that cover systems, support services for research, and a wide range of research grants. PSC has recently fielded two NSF resources: Bridges-2, a computational platform for rapidly evolving and data-centric research, and Neocortex, a unique artificial intelligence platform with unprecedented capability. PSC is supported by several federal agencies, the Commonwealth of Pennsylvania, and private industry, and is a leading partner in the NSF cyberinfrastructure program ACCESS (Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support).

Since its inception, more than 9,000 principal scientists and engineers (totaling 14,251 grants and 44,632 users) at nearly 1,500 institutions and research centers in 53 states and territories have used PSC computing resources. With 70 technical and administrative staff, and an annual budget of $16.5M, PSC advances the state-of-the-art in high-performance computing, communications, and data analytics, and offers a flexible environment for solving the largest and most challenging problems in computational science.

Key mission areas for PSC include:

- Deploying and managing advanced technology to meet the large-scale computing and data analysis needs of demanding problems in science and engineering;
- Partnering with researchers across the world to develop the computational resources needed to address grand challenges;
- Targeting rising opportunities in "big data" domains, ranging from health and medicine to the humanities and social sciences;
- Providing insights into complex systems and sharing the thrill of scientific discovery with the broadest possible audience;
- Developing software, techniques, and tools to improve cybersecurity;

- Preparing the next generation of scientists, data scientists, and engineers to use computational tools and techniques effectively across all domains;
- Promoting interdisciplinary research collaborations with Pitt and CMU faculty to ensure continued leadership in advanced computing applications and technology;
- Collaborating with colleges, institutes, and centers at Pitt and CMU to advance campus research across the full spectrum of faculty scholarship; and
- Partnering with outside entities in the public and private sector.

State-Of-The-Art Computing

PSC architects and operates a sophisticated facility that includes high-performance computing (HPC) systems, high-speed parallel filesystems, high-capacity data management services and leading-edge networking. Specifics include:

- Petascale Computing and Data: PSC's flagship research platform, Bridges-2, is a uniquely capable heterogeneous petascale resource for accelerating rapidly-evolving research in AI and data-centric research. Its richly-connected set of interacting nodes and active hierarchical storage systems offers exceptional flexibility for data analytics, simulation, workflows and gateways, leveraging interactivity, parallel computing, and AI/ML. (For complete information go to: www.psc.edu/resources/bridges-2/).
- Special Purpose Supercomputing for U.S. Scientists: PSC houses the only publicly accessible Anton-2 system, a special-purpose supercomputer for biomolecular simulation designed and constructed by D. E. Shaw Research.
- Extreme-scale AI/ML and deep learning: PSC's Neocortex platform, powered by two Cerebras CS-2 wafer scale engines, is a highly innovative resource that targets the acceleration of AI-powered scientific discovery by vastly shortening the time required for deep learning training, fostering greater integration of artificial deep learning with scientific workflows, and providing revolutionary new hardware for the development of more efficient algorithms for artificial intelligence and graph analytics.
- Networking: Network facilities at PSC consist of production and research LAN, MAN, and WAN infrastructures. PSC's WAN connections are provided by 3ROX (Three Rivers Optical Exchange), a regional network aggregation point operated and managed by PSC to provide cost effective, high capacity, state-of-the-art network connectivity to the university communities.
- Applications: PSC hosts advanced, scalable applications and software infrastructure to support research, scholarship, teaching, and learning in all disciplines of science, engineering, and the humanities. Applications are supported by PSC's domain experts who add value through integration, optimization, consulting, and training.
- Data Infrastructure: PSC maintains data infrastructure housing repositories for the NIH BRAIN Initiative (The Brain Image Library), two NIH Common Fund projects, the Human BioMolecular Atlas Program (HuBMAP) and the Cellular Senescence Network (SenNet), and a privately-funded breast cancer data repository.
- Training Facilities: PSC operates a state-of-the-art facility for hands-on training with world-wide video-conferencing support. A connected lecture hall provides space for up to 100 individuals, though a majority of training is conducted for remote participants.

ACCESS Integrated Advanced Digital Services

PSC is a leading partner in the ACCESS, the most advanced, powerful, and robust collection of integrated advanced digital resources and services in the world. In addition to the resources and services operated by PSC, ACCESS offers local faculty and students an integrated portfolio of supercomputers, high-end visualization and data analysis resources, and research support. PSC staff experts lead many of the nationwide ACCESS teams and can guide local faculty in understanding how to benefit from ACCESS resources and services. These include:

- No-cost allocation of the NSF ecosystem of resources, including PSC's;

- Advanced cybersecurity to ensure ACCESS resources and services are easily accessible to users but protected against attack;
- An advanced hardware and software architecture, rooted in user requirements and hardened by systems engineering, that allows for individualized user experiences, consistent and enduring software interfaces, improved data management, and transparent integration of campus resources into the overall ACCESS infrastructure;
- Mentoring for projects from disciplines, such as the social sciences and humanities, that traditionally have not used advanced computing.

Some of the most notable scientific achievements by PSC staff and external researchers using PSC resources include:

- The first simulation that explained a reversal of the earth's magnetic field from an underlying theory of how that field is generated;
- The first realistic 3-D model of blood flow in the heart, which led to the design of artificial heart valves;
- A sustained ten-year effort to improve the accuracy of prediction of paths of tornadoes, and the first simulation of a tornado;
- A realistic simulation of how aquaporins work, cited by the Nobel committee in their award of the Nobel Prize for the discovery of the structure of aquaporins;
- Visualizations enabling CMU's Tiziana Di Matteo and Rupert Croft to explain the emergence of supermassive black holes in the early universe;
- Enabling studies of trading practices, which led the New York Stock exchange and the NASDAQ to change their reporting rules to increase transparency;
- PSC experts, using their Bill and Melinda Gates Foundation-funded supply-chain monitoring software, advised the governments of Benin, Mozambique, India, Niger, Senegal, Kenya and Vietnam on improving their vaccine supply chains to enable every mother and child to receive life-saving vaccines;
- PSC's high-performance computers provided the backbone for the AIs that beat some of the world's best poker players, in both no-limit, one-on-one and six-player tournaments -- the first time AI beat the best human experts at an incomplete-information game;
- PSC-powered COVID science enabled by the Center's participation in the COVID-19 HPC Consortium includes tracking the spread of SARS-CoV-19 and other microbes, identifying weak links in the supply chain for COVID-fighting tools and leveraging AI to improve vaccines and drugs for combatting the virus; and
- A deep-learning study of a Japanese stamp dataset by PSC researchers and their colleagues identified better ways of handling long-tail training data, a critical weakness in life-safety AI applications.

The Pittsburgh Community

Pittsburgh is in the midst of a remarkable transformation from an industrial capital to a center of education, medical research, and new technology. The city hosts a high concentration of diverse and influential nonprofits and, as an international center of emerging information technology, is home to many small start-up companies, one of Google's national offices, Facebook's Oculus virtual reality research center, and Uber's autonomous vehicles development effort. Pittsburgh also is emerging as a leader in advanced manufacturing technologies and nanotechnology. While still a work in progress, the city's reinvention of itself has garnered widespread attention and has become a model for other cities seeking to replicate its success. As Rhode Island's governor put it while on a fact-finding mission to study Pittsburgh's economic renaissance, "Pittsburgh is an impressive model of how an old-economy steel town transformed itself into a cutting-edge medical and educational center of excellence." Further, a 2017 report from the Brookings Institution, "examines Pittsburgh's unique opportunity to become a top global destination for technology-based economic activity and as a key part of Pittsburgh's efforts to become a world-class innovation city."

Pittsburgh has all of the advantages of a large city in combination with the friendliness of the Midwest and the cultural sophistication of the East Coast. In 2022, U.S. News & World Report rated Pittsburgh among the best places to live in the U.S. Glassdoor named Pittsburgh the best city for jobs in both 2017 and 2018. The city boasts a wonderful array of distinctive neighborhoods and an abundance of residential choices ranging from unique lofts to living in the "country" while being only 20 minutes from the city. Housing is affordable and, as noted by *Forbes*, presents the second most stable housing market in the country. The city and its surrounding suburbs take pride in high-quality public, private, and parochial schools. Statistically, Pittsburgh is a safe city compared to other urban communities of its size. No longer a smoky steel town, Pittsburgh is clean and green and a model for its efforts to become pollution free.

Nomination and application process

Inquiries, nominations, and applications are invited. Interested candidates should submit confidentially, in electronic form (Microsoft Word or Adobe PDF files preferred), a curriculum vitae and letter of interest to PSC@russellreynolds.com**.**

PSC is an Affirmative Action/Equal Opportunity Employer and values equality of opportunity, human dignity and diversity. EEO/AA/M/F/Vets/Disabled.

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