

Position Description

Research Associate/ Research Fellow

Quantum Signal Estimation

Position Number: 00082715
Position Title: Research Associate
Date Written: March 2020

Faculty / Division: UNSW Canberra
School / Unit: SEIT
Position Level: Level A / Level B

ORGANISATIONAL ENVIRONMENT

UNSW is currently implementing a ten-year strategy to 2025 and our ambition for the next decade is nothing less than to establish UNSW as Australia's global university. We aspire to this in the belief that a great university, which is a global leader in discovery, innovation, impact, education and thought leadership, can make an enormous difference to the lives of people in Australia and around the world.

Following extensive consultation in 2015, we identified three strategic priority areas. Firstly, a drive for academic excellence in research and education. Universities are often classified as 'research intensive' or 'teaching intensive'. UNSW is proud to be an exemplar of both. We are amongst a limited group of universities worldwide capable of delivering research excellence alongside the highest quality education on a large scale. Secondly, a passion for social engagement, which improves lives through advancing equality, diversity, open debate and economic progress. Thirdly, a commitment to achieving global impact through sharing our capability in research and education in the highest quality partnerships with institutions in both developed and emerging societies. We regard the interplay of academic excellence, social engagement and global impact as the hallmarks of a great forward-looking 21st century university.

To achieve this ambition, we are attracting the very best academic and professional staff to play leadership roles in our organisation.

VALUES IN ACTION: OUR UNSW BEHAVIOURS

UNSW recognises the role of employees in driving a high-performance culture. The behavioural expectations for UNSW are below.



Delivers high performance and demonstrates service excellence.



Thinks creatively and develops new ways of working. Initiates and embraces change.



Works effectively within and across teams. Builds relationships with internal and external stakeholders to deliver on outcomes.



Values individual differences and contributions of all people and promotes inclusion.



Treats others with dignity and empathy. Communicates with integrity and openness.

OVERVIEW OF RELEVANT AREA AND POSITION SUMMARY

The Research Associate/ Research Fellow position is situated within the School of Engineering and Information Technology (SEIT). This position is a role within the UNSW-ANU research team working on the research project supported by the Australian Research Council Discovery Project “*Optimisation methods for coherent quantum signal estimation and filtering*”. The Research Associate will carry out research into the development of novel theory and optimization methodologies for coherent quantum signal estimation and filtering. The position will involve the development of research results and their publication in international conferences and journals. The Research Associate/ Fellow will also interact with PhD students and help in their supervision and where negotiated with the Chief Investigator (CI) and Head of School, may undertake teaching responsibilities as appropriate.

The Research Associate reports to CI of the discovery project.

RESPONSIBILITIES

Specific responsibilities for this role include:

At level A:

1. Conduct research in coherent quantum signal estimation and filtering, in collaboration with the members of the research team.
2. Contribute to preparation of reports summarizing the results gained from the research.
3. Prepare and publish research results, jointly with the research team members, in top quality international peer reviewed journals
4. Prepare and present conference publications at international conferences and/or workshops, and present at research seminars, as appropriate.
5. Contribute to the preparation of research proposal submissions to external funding bodies and actively seek collaborations with international collaborators as appropriate.
6. Contribute to School teaching activities (including teaching electrical engineering undergraduate courses as a teaching team member) as negotiated with the Chief Investigator and the School.
7. Interact with undergraduate, postgraduate and as appropriate PhD students and assist in their supervision.
8. Undertake a range of administrative tasks as directed.
9. Contribute to the common activities of the School, Faculty and University.
10. Cooperate with all health and safety policies and procedures of the university and take all reasonable care to ensure that your actions or omissions do not impact on the health and safety of yourself or others.

At Level B

In addition to level A above:

1. Undertake independent and collaborative research efforts in the development of quantum coherent estimation and filtering theory and algorithms.
2. Prepare reports summarising the findings gained from research and prepare research proposals for submission, including applications for external funding.
3. Engage in efforts to attract research students.
4. Undertake a range of high-quality undergraduate teaching activities within the Electrical Engineering discipline within the School as required.
5. Attend School and Faculty meetings and participate in professional activities as appropriate.
6. Ensure hazards and risks are identified and controlled for tasks, projects and activities that pose a health and safety risk within your area of responsibility.

SELECTION CRITERIA

At Level A

1. A PhD degree in mathematics, physics or engineering with a strong background in Quantum Control, Control Systems Theory, or Optimization Theory.
2. Demonstrated ability to conduct innovative and independent research.
3. A record of high quality publications in journals and/or conferences of high ranking in the field relevant to the project.
4. Excellent proficiency in Matlab coding.
5. Ability to conduct high quality teaching in a University environment and willingness to undertake teaching duties as required.
6. Excellent interpersonal, oral and written communication skills appropriate for interacting effectively with team members, collaborators and colleagues across the Faculty.
7. Demonstrated ability to complete tasks within agreed time frames, with suitable supervision.
8. Knowledge of health and safety responsibilities and the ability and capacity to implement required UNSW health and safety policies and procedures.

At Level B

1. A PhD degree in mathematics, physics or engineering with a strong background in Quantum Control, Control Systems Theory, or Optimization Theory.
2. Relevant postdoctoral research experience in a university or research organisation with experience in coherent quantum control, constrained and distributed optimization including semidefinite programming and/or sum of squares methods.
3. Emerging track record of publications in top quality journals (such as Automatica, IEEE Transactions on Automatic Control, Physical Reviews Letters or similar standing) in the field of quantum control, control systems theory and/or optimization, both pre and post PhD.
4. Excellent proficiency in Matlab coding.
5. An emerging track-record for securing research support from competitive grant schemes.
6. Excellent interpersonal, oral and written communication skills appropriate for interacting effectively with team members, collaborators and colleagues within the broader community and professional & industry bodies.
7. Demonstrated ability to work independently to complete tasks within agreed timeframes.
8. Ability to undertake quality teaching of both introductory and specialist courses at undergraduate and postgraduate level and the ability to apply new and innovative methods for teaching.
9. A demonstrated ability to successfully supervise research students.
10. Ability and capacity to implement required UNSW health and safety policies and procedures.

It is not the intention of the position description to limit the scope or accountabilities of the position but to highlight the most important aspects of the position. The aspects mentioned above may be altered in accordance with the changing requirements of the role.