Australian Government

ANSTO
Science. Ingenuity. Sustainability.

POSITION DESCRIPTION

Position Title:	Organic Synthetic Chemist
Cluster / Business Unit / Division	NSTLI/Research Infrastructure
Section or Unit:	National Deuteration Facility
Classification:	Band 5/6 (Linked)
Position Description Number:	PD-2122
Work Contract Type:	Professional
STEMM/NON-STEMM:	STEMM

POSITION PURPOSE

The purpose is to contribute towards the production, purification and characterisation of small organic molecules, and their precursors, labelled with deuterium using isotopic exchange and synthetic chemistry techniques. This enables structural investigations using neutron scattering, NMR and other techniques, by internal and external users of the National Deuteration Facility (NDF). Develop new isotopic exchange and deuteration techniques, using specialised expertise for the production of deuterated molecules and the use of solution NMR or Mass Spectrometry for the characterisation of deuterated and other molecules for the NDF and other ANSTO research groups.

ORGANISATIONAL ENVIRONMENT

ANSTO leverages great science to deliver big outcomes. We partner with scientists and engineers and apply new technologies to provide real-world benefits. Our work improves human health, saves lives, builds our industries and protects the environment. ANSTO is the home of Australia's most significant landmark and national infrastructure for research. Thousands of scientists from industry and academia benefit from gaining access to state-of-the-art instruments every year.

The National Deuteration Facility (NDF) is Australia's national facility for isotopic labelling of molecules with the stable, non-radioactive isotope deuterium using chemical or biological processes in order to enhance contrast, and reduce background when conducting structural studies using neutron scattering instrument operated by the Australian Centre for Neutron Scattering at the OPAL Reactor, or using spectroscopic techniques such as Nuclear Magnetic Resonance (NMR), Infra-Red (IR) or Mass Spectrometry (MS).

The NDF is a world leader in chemical deuteration and equal to the benchmark for Biodeuteration. It is the only facility of its kind in southern hemisphere and has an oversubscribed user program with greater than 100 users per year from 25 institutions benefitting from the NDF's capabilities. The NDF has significant international engagement with institutions in Europe, Asia and the U.S.A.

ACCOUNTABILITIES & RESPONSIBILITIES

Key Accountabilities – Band 5

- Provision of highly specialised chemical deuteration expertise to NDF users including undertaking deuteration reactions, chromatographic purification of deuterated molecules and their characterisation using NMR and MS.
- Responsibility for individual approved NDF deuteration proposals from external users as assigned by the Operations Manager - NDF, including liaison with the client.
- Contribution to design and development of protocols for production and purification of deuterated organic molecules using hydrogen exchange at high temperature and pressure (or novel processes) to produce deuterated precursors followed by modified traditional synthesis routes for assigned NDF proposals.
- Contribution to in-house, collaborative and NDF-user research projects requiring production of deuterated molecules.

- Contribution to journal and conference publications including authorship on papers arising from NDF proposals the role holder led.
- Responsibility for the operation and maintenance of instruments as assigned, including training of other staff in their use.
- Undertake additional duties as required and during periods of leave of other staff.

Key Accountabilities – Band 6

- Contribute to the establishment of new protocols for production and purification of deuterated chemicals using repeated hydrogen exchange at high temperature and pressure (or novel processes) to produce deuterated precursors followed by modified traditional synthesis routes.
- Apply specialised expertise to the characterisation of the deuterated products, particularly using NMR or Mass Spectrometry.
- Provision of the chemical deuteration expertise and infrastructure to NDF users including undertaking deuteration reactions, purification of deuterated molecules and their characterisation.
- Contribute to in-house, collaborative and NDF-user research projects requiring production of deuterated molecules (using chemical processes) for structural investigations.
- Establish networks with external researchers undertaking investigations that would benefit from the use of deuterated molecules and be responsible for self-determined contribution of nuclear science and technology to those investigations.
- Contribute to journal and conference publications that arise.
- Undertake additional duties as required and during period of leave of other staff.

Decision Making

The position holder will be responsible for part or all of the laboratory work required to produce labelled molecules and in this context will:

- Design (or contribute to design), discuss, and reach agreement with the NDF Operations Manager on, approaches to the labelling and chemical synthesis of specific molecules in NDF proposals
- Determine key work priorities within the context of agreed weekly and monthly work plans and consult with the NDF Operations Manager on complex or major technical or methodological issues that have a significant impact on completion of NDF proposals for molecular labelling
- Be fully accountable for the accuracy and quality of experimental results provided to the NDF Leader, and ensure that day to day decisions on laboratory work are based on sound evidence which at times may be require to make effective judgements under pressure or in the absence of complete information or expert advice.
- Band 5 role: making decisions on the possible routes to produce the deuterated molecules.
- Band 6 role: making decisions on the design of the synthesis for the production of deuterated molecules
- The levels of authority delegated to this position are those approved and issued by the Chief Executive Officer. All delegations will be in line with the ANSTO Delegation Manual AS-1682 (as amended or replaced).

Key Challenges

The major challenges for this position include:

- Timely achievement of client-focussed research goals in a multi-tasking environment requiring initiative and self-motivation
- Recognising and grasping opportunities to become involved in the science of the facility
- Development of a distinctive and unique (compared with other team members and external researchers) national profile in this field
- Liaising with NDF users (internal ANSTO staff and external researchers)
- Expanding horizons in terms of techniques in synthetic chemistry and molecular characterisation.

- Development of a distinctive and unique (compared with other team members and external researchers) national and international profile in this field.

KEY RELATIONSHIPS

Who	Purpose
Internal	
NDF Leader	Purpose: • Receive guidance and direction • Recommend and gain endorsement for plans and goals and other initiatives • Report on progress of NDF deuteration proposals • Provide expert, authoritative and evidence based information and advice on safety and quality aspects of the NDF's operations
Chemical Deuteration Team members	Purpose: • Provide expert advice and analysis on a full range of matters • Contribute to group decision making processes, planning and goals • Collaborate and share accountability • Negotiate and resolve conflicts
Other Scientists in NSTLI	• Provision of deuterated molecules for research • Advice on organic synthesis or deuteration • Supervision of use of NDF instrument facilities
External	
Researchers from Universities and Research Institutions in Australia and overseas and the commercial R&D sectors in Australia and potentially the Asian Pacific region	• Execution of NDF user program proposals i.e. production of deuterated molecules for users

POSITION DIMENSIONS

Staff Data	
Reporting Line	Reports to the NDF Leader
Direct Reports	Nil
Indirect Reports	Nil

Financial Data (2020/2021)	
Revenue / Grants	N/A
Operating Budget	N/A
Staffing Budget	N/A
Capital Budget	N/A
Assets	N/A

Special / Physical Requirements	
Location:	Lucas Heights Working in different areas of designated site/campus as needed
Travel:	N/A

Physical:	Office based physical requirements (sitting, standing, minimal manual handling, movement around office and site, extended hours working at computer) Standing for long periods doing laboratory work Public speaking Wearing personal protective equipment for the handling of hazardous and/or radioactive materials
Radiation areas:	May be required to work in radiation areas under tightly regulated conditions
Hours:	Willingness to work extended and varied hours based on operational requirements
Clearance requirements:	Satisfy ANSTO Security and Medical clearance requirements Obtain and maintain appropriate federal government clearance

Workplace Health & Safety
Specific role/s as specified in AP- All Workers 2362 of the ANSTO WHS Management System

ORGANISATIONAL CHART

Refer to published Organisational Chart

KNOWLEDGE, SKILLS AND EXPERIENCE

Band 5

1. Honours degree or higher in organic chemistry or other relevant fields of science (essential)
2. Significant experience (5 years laboratory experience) in the synthesis of organic molecules (essential).
3. Significant experience in the chromatographic separation and purification of molecules to a high standard.
4. Experience in organic/organometallic catalysis reactions (preferred)
5. Experience in the characterisation of molecules using NMR, IR, Mass Spectroscopy or Chromatographic techniques (preferred).
6. Strong customer focus
7. Demonstrated ability to contribute to journal publications and to present science at conferences (essential).
8. Proficiency in a Windows computer environment and Microsoft Office
9. Ability and willingness to work in a team environment (essential)
10. Ability to keep accurate records and a meticulous approach to execution of research in the laboratory.

Band 6

1. A PhD, DPhil. or equivalent in organic chemistry or other fields of science of science relevant to organic synthesis and isotopic exchange.
2. Several years post-doctoral experience in physical and chemical characterisation of organic compounds using advanced techniques (e.g. NMR, chromatography, mass spectrometry).

3. Possesses experience in synthesis of organic molecules (e.g. surfactants, lipids, heterocyclics/aromatics, or polymers) and their separation and purification to a high standard.
4. Familiarity with deuterium labelling techniques and their applications to structural investigations of soft condensed matter.
5. Demonstrated ability to initiate and be responsible for independent research
6. Demonstrated ability to publish research findings in international journals
7. An ability to keep accurate records and a meticulous approach to execution of research in the laboratory.
8. Proficiency in a Windows computer environment and Microsoft Office.
9. Strong customer focus
10. Ability and willingness to work in a team environment
11. Ability to recognise and pursue R&D opportunities relevant to the NDF's and ANSTO's activities.

Linked Role Transition

Transition to the higher Band within the linked role is not automatic and ability to perform Band 6 accountabilities will need to be demonstrated and assessed. This can be done by completing the attached form and completing a full written submission demonstrating and justifying how an employee meets the transition requirements.

VERIFICATION

This section verifies that the line manager and appropriate senior manager/executive confirm that this is a true and accurate reflection of the position.

Line Manager	**Delegated Authority**
Name:	Name:
Title:	Title:
Signature:	Signature:
Date:	Date:

[Position Title] (PD-2122) Band 5 to Band 6 Transition Checklist	
Name:	
Commencement Date:	
Assessment Date:	

Written submission demonstrating and justifying how the employee meets requirements must also be attached.

Requirements for transition	Met Criteria
a) Minimum 5 years working as Organic Synthetic Chemist (Band 5) OR b) Minimum 5 years equivalent experience	☐ Yes ☐ No OR ☐ Yes ☐ No
PhD in Chemistry or equivalent	☐ Yes ☐ No
Extensive experience in organic synthesis and characterisation of deuterated moleucles and demonstrate meeting all below requirements	☐ Yes ☐ No

Demonstrated ability to independently and responsibly perform Band 6 accountabilities and apply required knowledge, skills and experience for the Band 6 position including:	
Undertake band 5 accountabilities at a technical expert level and independently without supervision or guidance	☐ Yes ☐ No
Contribute to the establishment of new protocols for production and purification of deuterated chemicals using repeated hydrogen exchange at high temperature and pressure (or novel processes) to produce deuterated precursors followed by modified traditional synthesis routes.	☐ Yes ☐ No
Apply specialised expertise to the characterisation of the deuterated products, particularly using NMR or Mass Spectrometry.	☐ Yes ☐ No
Provision of the chemical deuteration expertise and infrastructure to NDF users including undertaking deuteration reactions, purification of deuterated molecules and their characterisation.	☐ Yes ☐ No
Contribute to in-house, collaborative and NDF-user research projects requiring production of deuterated molecules (using chemical processes) for structural investigations.	☐ Yes ☐ No
Establish networks with external researchers undertaking investigations that would benefit from the use of deuterated molecules and be responsible for self-determined contribution of nuclear science and technology to those investigations.	☐ Yes ☐ No
Publish work in the field of deuteration science	
Promotion of teamwork, knowledge sharing, collaborative and user focussed working environment	☐ Yes ☐ No
Training, supervision and provision of expert advice to staff and users (scientists, researchers, post-docs, students) to ensure effective and safe work within the facility and to ensure safety, regulatory and legislative compliance	☐ Yes ☐ No

Attach written submission demonstrating and justifying how the employee meets <u>each</u> of the above requirements.

Manager Recommendation

I have reviewed the employee's competence in accordance with Linked Role PD-2122 and certify that the employee meets all requirements for transition and recommend transition from Band 5 to Band 6 be endorsed as demonstrated in the attached written submission detailing how the employee meets each of the requirements.

Name & Title:			
Signature:		Date:	

Leader, Isotope Tracing in Natural Systems

I have reviewed all information and approve transition from Band 5 to Band 6.

Name & Title:			
Signature:		Date:	
Effective date of transition:			