



DC6: Replication and compartmentalisation

Supervisor: Prof. Sijbren Otto, s.otto@rug.nl

Host institution: University of Groningen (RUG), Stratingh Institute for Chemistry – Centre for Systems Chemistry, Groningen, Netherlands



The University of Groningen, established in 1614, has brought forward exceptional academics, like the first female student and the first Dutch astronaut. It ranks 'Top 100' in the ARWU Shanghai Ranking and the The World University Rankings. It has an excellent Chemistry Department (for example, Nobel Prize for

Prof. Feringa in 2016). The research group of Sijbren Otto is world leading in Systems Chemistry, with a special emphasis on self-replicating systems, and pioneering in the area of the de-novo synthesis of life.

Project description: The project aims to characterize systems of self-replicating molecules that are capable of catalysing the formation of molecules that assemble into compartments (amounting to a primitive metabolism) that then house the replicator. This project builds on a recent breakthrough discovery that self-replicating molecules can catalyse reactions to yield molecules that assemble into compartments. This process yields coacervate microdroplets into which the replicators partition and continue to replicate. The project involves a detailed thermodynamic and kinetic characterisation of these systems. Specifically, DC6 will: (1) Quantify the partitioning and exchange kinetics of replicators, replicator precursors and compartment precursors between bulk water and the coacervate phase. (2) Determine the replication kinetics inside the compartments and the growth kinetics of the compartments. (3) Measure the effect of compartmentalisation on the catalytic production of replicator precursors.

Secondments: This project is carried out in strong collaboration with the following groups, and visits to their laboratories are expected during the project. A willingness to travel and spend time abroad is therefore essential:

- Host: Spectrometry Vision BV (MSV) | Length: 3 months | Purpose: Characterisation of replicators inside coacervate droplets by mass spectrometry.
- Host: University of Saarland (USAAR) | Length: 2 months | Purpose: Determine influence of coacervate environment on chemical reactions occurring inside droplets.

Eligibility conditions:

• An internationally recognised MSc degree in chemistry, or a related field.

Required Skills:

• Applicants whose first language is not English must submit evidence of competency in English, please see <u>University of Groningen's English Language Requirements</u> for details.

Monthly allowances:

- Living allowance: €3400*
- Mobility allowance: €600
- Family allowance, if applicable: €660

Estimated gross salary: ~38,600 €/year (first year) to ~49,500 €/year (final year)

* The living allowance is adjusted by a <u>country correction coefficient</u>, depending on the country where the host institution is located. The exact net salary is dependent on local tax and social and health insurance regulations and will be confirmed upon appointment.

Enquiries

For general information about the DarChemDN visit the project website or send an email to info@darchem-dn.eu.



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How to apply

To complete your online application, visit the <u>DarChemDN recruitment web page</u>.

Required documents:

- Cover Letter
- Curriculum Vitae (including contact information of two referees)
- Copy of Transcripts
- Copy of Diplomas (if available at the time of application otherwise please provide a confirmation with the expected graduation date)

Only shortlisted applicants will be contacted. Interviews are expected to be online in November/December 2023.

Application deadline: To receive full consideration, applications must be submitted before **31 October 2023**.



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