



## PhD Scholarship in Mathematics Education (1)

Norwegian University of Science and Technology (NTNU – Norway) in collaboration with Bahir Dar University – BDU (Ethiopia) invites academic staff from BDU to apply for a PhD scholarship within the framework of the NORHED funded project on "**Enhancing the Quality of Science and Mathematics Education in Ethiopia and South Sudan**". The project is a six years project from January 2021 to December 2026, led by NTNU with grant funding from the Norwegian Agency for Development Cooperation (NORAD) NORHED Programme. The project aims to:

- Enhance the quality and relevance of science and mathematics teacher education programs
- Develop the capacity of teacher educators, school teachers, and experts in addressing the problem of the quality of science and mathematics education
- Produce more and better research in the areas of science and mathematics education

As part of developing the capacity of staff and students, there is a plan to recruit PhD candidates on competition basis from the southern partner universities. This call is for inviting candidates from BDU for a PhD position in Mathematics Education for the following focus area.

### Focus area/direction of the PhD project

Inquiry-based learning (IBL) is a student-centered teaching and learning approach that has received notable attention in mathematics education internationally. Mathematics educators explore ways in which IBL could be implemented to improve the teaching and learning of mathematics. This PhD study focuses on how problem-posing (PP) activities could be used with digital tools to meet this goal. Past research in mathematics education suggested several benefits for integrating PP activities in teaching and learning mathematics, such as facilitating the development of conceptual understanding of mathematics and making mathematics teaching and learning more interesting for students.

In this study, Jaworski's (2014) conceptualisation of IBL will be used that discuss three inter-related layers of inquiry: Inquiry in mathematics, Inquiry in mathematics teaching, and inquiry in the research process. This study also benefits from a theoretical tool, the 'teaching triad', that is presented in this approach to characterise teaching that has three domains: management of learning, sensitivity to students, and mathematics challenge.

The role of technologies in the professional development of mathematics teachers and its possible potential for improving the teaching and learning of mathematics within the lens of "tool use" has received robust attention from the mathematics education community. One particular framework to explore how teachers could design PD activities with digital tools is *professional instrumental genesis* (Haspekian, 2014). This PhD research will explore mathematics teachers' professional instrumental genesis while they engage with a digital context at the beginning and later how they transform digital tools into didactical tools in their teaching. For this purpose, a design-based research with a mixed method approach would be considered in the project, including administering questionnaires, video recording of teaching episodes, and conducting focus group and individual interviews.

## References

- Haspekian, M. (2014). Teachers' Instrumental Geneses When Integrating Spreadsheet Software. In A. Clark-Wilson, O. Robutti, & N. Sinclair (Eds.), *The Mathematics Teacher in the Digital Era*. Springer. [https://doi.org/10.1007/978-94-007-4638-1\\_11](https://doi.org/10.1007/978-94-007-4638-1_11)
- Jaworski B. (2014). Unifying Complexity in Mathematics Teaching-Learning Development: A Theory-Practice Dialectic. In Y. Li, E. Silver, & S. Li (Eds.), *Transforming Mathematics Instruction. Advances in Mathematics Education*. Springer. [https://doi.org/10.1007/978-3-319-04993-9\\_24](https://doi.org/10.1007/978-3-319-04993-9_24)

## Duties of the PhD Position

- The PhD position provides an exciting opportunity to gain broad experience and expertise collaborating with international researchers.
- The main duties are:
  - Complete obligatory coursework in the PhD program (a minimum of 30 ECTS).
  - Design activities and collect data through both qualitative and quantitative methods.
  - Collaborate with others, co-authoring research papers etc.
  - Disseminate project findings at international key mathematics education conferences.
  - Complete a PhD thesis, preferably based on referred articles published in the key journals. The successful candidate, as part of the PhD study, should write at least two research articles for well-established mathematics education research journals.

## Application requirements, qualifications and experience:

- Applicants must have a strong academic background with at least two years of Master's Degree studies from a recognized higher learning institution. Both the grade for the Master's thesis and the weighted average grade of the Master's degree must individually be equivalent to or better than a B grade in NTNU's grading scale.
- The successful candidate preferably has a master's degree in mathematics education; however, candidates with a master's degree in mathematics could also apply for this position. The latter group of candidates should show a good understanding of mathematics education literature/theories in the submitted research proposal.
- Excellent English skills (written and oral).
- Experience with teaching (minimum of 2 years) and conducting research in teacher education and strong analytical and writing skills (any peer-reviewed publications) will be considered a major advantage.
- Female candidates are encouraged to apply.
- Age limits: Not more than **45 years** at the time of application

## PhD Scholarship and study conditions:

- The successful candidate will have PhD scholarship for a period of three years and will be expected to register at the Norwegian University of Science and Technology (NTNU) in Norway. The student will be expected to follow the registration procedures at NTNU. The student will be expected to spend a total of 14 months at NTNU and the rest of the PhD study period will be spent at the home institution. The monthly stipend will be **NOK 19,000** while in Norway and a one time payment of **NOK 13,559** for the period spent at home institution. The home institution is expected to cover the salary of the candidate while staying at home institution for field work. The successful candidate will become part of an

organized research team on the BDU-NOHERD Project and will be expected to write a paper based thesis which will contribute to the project's publication targets. Thus, the candidate should be able to work independently but also as part of the project team. Research and travel expenses to and from Norway will be covered by the project.

### The application must include

- A cover letter where the applicant describes the personal motivation, summarising scientific work, and how the applicant sees her/his background suitable.
- CV (summarising education, positions, pedagogical experience, administrative experience and other qualifying activity etc).
- Certificates, transcripts and diplomas for bachelor's and master's degrees.
- A copy of the master's thesis if it is in English.
- a PhD research proposal of no more than ten pages (page format A4 with 2.5 cm margins, 1.5 spacing and Times New Roman 12-point font) outlining the thematic focus and specifying how it relates to the overall project, research questions or hypothesis, methodological and theoretical focus, a timeframe of activities and a list of expected outputs. This proposal will be neither final nor binding for the PhD activities.
- Name and contact information of two referees (name, relation to candidate, e-mail address, and telephone number).
- Academic works - published or unpublished - that you would like to be considered in the assessment (up to 3 items).

### The selection process

- Applications will be evaluated by the Project Team. The final decision will be made by the potential supervisors at NTNU and the home institution based on recommendations from the project team. When assessing the applications, emphasis will be put on: 1) The quality of the project proposal, 2) The proposal's alignment with the project goals, and 3) the Master's Study grades.
- The successful applicant must qualify for formal admission as a PhD student at NTNU. See <https://www.ntnu.edu/phd/admission-and-financing> for information about PhD studies at NTNU.

### Expected start date

- The planned starting date is January 2023. The student will be expected to refine the research proposal at NTNU, review literature, participate in seminars and possibly take some methodological courses.

### Application deadline

- All application materials (including scanned copies of academic documents) must be received by **20 October 2022** until 5pm (Ethiopian time).

### How to apply

Interested applicants should submit applications by e-mail to

- Dr. Dawit Asrat Getahun (the Project Coordinator at BDU), [dawit.asrat.getahun@gmail.com](mailto:dawit.asrat.getahun@gmail.com)
- Professor Jørund Aasetre (the Project Coordinator at NTNU), [jorund.aasetre@ntnu.no](mailto:jorund.aasetre@ntnu.no)
- Dr. Charlotte N. Jjunju (the Project Administrator at NTNU) [charlotte.jjunju@ntnu.no](mailto:charlotte.jjunju@ntnu.no)
- Dr. Maria I.M. Febri (the Project team member at NTNU), [maria.i.febri@ntnu.no](mailto:maria.i.febri@ntnu.no)