The United Nations University Geothermal Training Programme

Gylfi Páll Hersir, Iceland GeoSurvey and Studies board member UNU-GTP

Monday April 8th 2019
United Nations University
Geothermal Training Programme in Iceland:
Capacity Building for Geothermal Energy Development

Málfríður Ómarsdóttir
Environmental scientist/editor
UNU-GTP
United Nations University Geothermal Training Programme

• Operated in Iceland since 1979

• Aims at assisting developing nations with geothermal potential to build up expertise in geothermal exploration and development through:
  • **Annual 6-month training programme** in Iceland for geothermal professionals, through UNU Fellowships
  • Offering **MSc and PhD fellowships** in Iceland to former UNU Fellows to progress further in geothermal studies
  • **Annual Short Courses** in two key geothermal regions: East Africa and Latin America
  • Offering services of externally sponsored **customer-designed courses** in line with the needs of the customer
Organization of UNU-GTP

• Operated at Orkustofnun – the National Energy Authority of Iceland
• **Five** full time staff members
• Annually **80-120 lecturers and support staff** are hired from Iceland’s leading geothermal institutes, universities, engineering companies and energy companies to supervise and give lectures in line with the need of the respective UNU Fellows
• Academic activities governed by a **Studies Board**, chaired by the Director, with representatives from leading research institutes
• Governed by a **Board** with representatives from UNU, OS, Ministry for Foreign Affairs and the Director UNU-GTP
Board members
Dr. Sebastian von Einsiedel, Vice Rector UNU
Dr. Gudni Johannesson, Dir. Gen. OS
Amb. María Erla Marelsdóttir, MFA
Ludvik S. Georgsson, Dir

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Ludvik S. Georgsson, Dir.

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Borehole Geology
Dr. Hjalti Franzson

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Finnbogi Óskarsson

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Dr. Brynhildur Davídsdóttir

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Kristinn Ingason

Geothermal Utilization
Dr. Páll Valdimarsson

Project Managem. & Financ.
Dr. Helgi Thór Ingason

UNU-GTP
Landsvirkjun
ÍSOR - Iceland GeoSurvey
ÍSOR - Iceland GeoSurvey
ÍSOR - Iceland GeoSurvey
University of Iceland
Mannvit
Reykjavík University
Reykjavík University
Candidates and Fellowships

Candidates for 6-month training are selected by personal interviews usually during site visits to the respective country or at Short Courses

Candidates

.. must have a permanent position at a governmental energy company, research institution or university, and be nominated for this training by their institution

.. should have one year practical experience in geothermal work

.. need to be fluent in English

.. must have a university degree in science, engineering (or economics)

.. preferably be under 40 years of age

UNU Fellowships

Financed by the Government of Iceland — The Programme is part of Iceland’s official developing assistance but foreign/international institutions have also supported individuals from developing/transitional countries in attending the training programme
# The 6-month training time schedule

## Group Project Work

<table>
<thead>
<tr>
<th>Week</th>
<th>Geothermal Geology</th>
<th>Geophysical Exploration</th>
<th>Reservoir Engin./Borehole Geophy.</th>
<th>Chemistry of Thermal Fluids</th>
<th>Environmental Science</th>
<th>Geothermal Utilization</th>
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<th>Project Management and Financing</th>
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<td>Introductory Lecture Course and Group Project Work</td>
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<td>Specialized Training: Lectures, Visits and Excursions - some lecture selection</td>
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<td>Specialized Training cont.</td>
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<td>Individual Project and Report Writing</td>
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**United Nations University Geothermal Training Programme (UNU-GTP)**

10.4.2019
Final project reports

• Sent to libraries of most geothermal institutions and some individuals
• All research reports are also available in open distribution at our website: www.unugtp.is
UNU visiting lecturer

• Annually one guest lecturer with an international reputation invited for lectures and discussion with the UNU Fellows
• Lectures usually published and are available on our website
• Recent UNU Visiting Lecturers include:

<table>
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<tr>
<th>Year</th>
<th>Lecturer Name</th>
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<tbody>
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<td>Trevor Hunt (NZ)</td>
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<td>Roland N. Horne (USA)</td>
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<td>Hilel Legman (Israel)</td>
<td>2011</td>
<td>Ernst Huenges (Germany)</td>
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<td>2002</td>
<td>Karsten Pruess (USA)</td>
<td>2012</td>
<td>Cornel Ofwona (Kenya)*</td>
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<td>2003</td>
<td>Beata Kepinska (Poland)*</td>
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<td>2004</td>
<td>Peter Seibt (Germany)</td>
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<td>Malcolm Grant (NZ)</td>
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<td>2005</td>
<td>Martin Mwangi (Kenya)*</td>
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<td>Meseret Teklemariam (Ethiopia)</td>
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<td>2006</td>
<td>Hagen Hole (NZ)</td>
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<td>James Koenig (USA)</td>
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<td>2007</td>
<td>José Antionio Rodriguez (ES)</td>
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<td>Juliet Newson (NZ)</td>
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<td>2008</td>
<td>Wang Kun (China)*</td>
<td>2018</td>
<td>William Cumming (USA)</td>
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<td>2009</td>
<td>Wilfred Elders (USA)</td>
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* former UNU Fellow
MSc and PhD studies

• Carried out at the University of Iceland or Reykjavik University
• The 6-month training fulfils 25% of the requirements (30 out of 120 ECTS units) for an MSc degree
• UNU Fellowships cover costs associated with living in Iceland
• Research projects published by UNU-GTP
Participation in UNU-GTP in Iceland

1979 – 2018

- 694 scientists and engineers from 61 countries have completed the 6-month specialized course
- Thereof 158 are women (22%). Last 10 years 30% are women reflecting the UNU and MfA gender policy
- MSc fellowships since 2000: 62 graduates – 10 currently enrolled
- PhD fellowships since 2008: 2 graduates – 4 currently enrolled
UNU-GTP FELLOWS IN ICELAND 1979-2018
(694 FROM 61 COUNTRIES)
SDG Short Courses

- A special contribution of the Government of Iceland through UNU-GTP
- Series of Annual Short Courses on Geothermal Exploration and Development given in two continents, Africa, and Latin America and the Caribbean (LAC)
- Through the short courses we have been able to reach a much larger participant group

Courses held annually in El Salvador and Kenya
Over 1200 participants trained in total since 2005
UNU-GTP Short Courses

Iceland’s contribution to the Sustainable Development Goals

Annual Short Courses on geothermal development held in developing countries for local professionals to advance and speed up the capacity building by bringing the training to the trainees
UN Sustainable Development Goals (SDGs)
UN Sustainable Development Goals (SDGs)

• A universal initiative for action to:
  ➢ End poverty
  ➢ Protect the planet
  ➢ Ensure a future for human wellbeing and health through sustainable ways

• 17 goals on different topics towards a sustainably developed world

• Adopted in 2015 and targets to be reached by 2030
UNU-GTP SDG Short Courses

Africa: held in Kenya since 2005, 3½ week long short courses on “Exploration for Geothermal Resources” in cooperation with KenGen and GDC

Total of 708 Participants trained in Kenya

Participants at the Short Course in 2013
UNU-GTP SDG Short Courses

Latin America: held in El Salvador since 2006, about 1 week long short courses in cooperation with LaGeo, the course now also includes the Caribbean Islands.

Total of 622 participants trained in El Salvador.
UNU-GTP SDG Short Courses

Asia: held in China in 2008 a series with emphasis on low-temperature utilization was started in with the Workshop for Decision Makers in Geothermal in Tianjin - this series has not been continued but hopefully this will be reestablished in future.
Encouraging results!!

• With the short courses UNU-GTP has been able to reach out to a much larger group than would otherwise be possible solely in Iceland

• New countries have been added, for which the short courses have proven a suitable start

• Trainees doing well at short courses have become potential candidates for 6-month training in Iceland

• With over 1300 participants over the last 10 years, the E-African and Latin American Short Courses are adding to the capacity building to significantly further geothermal development in respective regions
Customer-designed courses & training

- **New services from 2010** – and a growing part of our operations
- **Sponsored by the customer** or some other support mechanism
- Can be a **general geoscientific course** or **specialized on a subject**
- Examples from 2010-2014:
  - *Course on Geothermal Drilling* – 4 weeks – Indonesia, 2010
  - Training services in *Geology, Geophysics and Geochemistry* – 4 weeks – GDC, Kenya, 2010
  - *Course on Geothermal Exploration and Development* – 1 week – OAS, in El Salvador, 2011
  - *Course on Geothermal Technology* – 13 weeks – KenGen, Kenya, 2012
  - Advanced training in *Borehole Geology* – 4 months – EWSA, Rwanda, 2013
  - Short Course on Geothermal Exploration – 1 week – CeMIE-Geo, Mexico, 2014
Focusing on a geothermal future

✓ The main activity is the 6-month training in Iceland

✓ We hope to increase number of scholarships for MSc studies and PhD studies in Iceland

✓ The UN Sustainable Short Course Series are attracting a lot of attention with more and more numbers of participants each year

✓ The Customer-Designed Short Courses are now a significant and growing factor in the operations of UNU-GTP
Looking to the future

• Utilization of **indigenous renewable energy resources** as a replacement for fossil fuels is vital in a world where increasing emission of greenhouse gasses and global warming is becoming one of the greatest threats to mankind.

• **Capacity building and transfer of technology** are key issues in the sustainable development of geothermal resources.

• The UNU-GTP will continue to support **geothermal development** in the world to the best of our capabilities.
Thank you