



The **M.Sc.-Program Environmental Governance (MEG)**  
and the **Graduate School Environment, Society and Global Change (GS-ESGC)**  
offer

# A beginner's immersion course in systems thinking, systems analysis and system dynamics.

**Monday, July 1<sup>st</sup> to Wednesday, July 3<sup>rd</sup> 2019** for members of the Graduate School.

“There are many complex and interrelated issues with respect to resource use, scarcity, efficiency, and the resource-energy-climate nexus, all of which are within the focus area of resource policy. For a comprehensive understanding of such issues on resource policy, it is essential to analyze key dynamics and conditions in the complex natural resources system from many different aspects (i.e. political, environmental, social, technological, legal, institutional, economic), and from national to global levels. [...] Systems science aims to identify, explore and understand patterns of complexity through contributions from various disciplines, foundations, theories and representations. It is the use of systems thinking along with application of systems approaches, methodologies and tools (i.e. systems analysis and system dynamics) that make it possible to practice integrative systems science for studying and managing complex feedback systems in nature and society.”<sup>1</sup>

In cooperation with



**Icelandic System  
Dynamics Center,**  
University of  
Iceland



**Prof. Dr. Harald Ulrik Sverdrup.** Professor of Industrial Engineering at University of Iceland. Has started and has taught systems analysis and System Dynamics courses in Lund University for 20 years, then at Stockholm University, Sweden, Computer Games Center at Innlandshøgskolen, Hamar, Norway and presently at University of Iceland since 1990. Has used the STELLA software for modelling of everything since version 1.0.



**Dr. Anna Hulda Olafsdottir.** Lecturer at University of Iceland. Teaches System Dynamics and computer simulations at University of Iceland at the Icelandic System Dynamics Center since many years. Coauthor on the WORLD6 model. The world's kindest and strongest systems analyst ever seen. Several times European Champion in cross-fit.

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<sup>1</sup> Hirschnitz-Garbers, M., Koca, D., Sverdrup, H., Meyer, M., & Distelkamp, M. (2018). *System analysis for environmental policy – System thinking through system dynamic modelling and policy mixing as used in the SimRes project* (Vol. 49/2018). Dessau-Roßlau: Umweltbundesamt. Available at [https://www.ecologic.eu/sites/files/publication/2018/2018-06-25\\_texte\\_49-2018\\_simress\\_system\\_analyses\\_report1\\_en.pdf](https://www.ecologic.eu/sites/files/publication/2018/2018-06-25_texte_49-2018_simress_system_analyses_report1_en.pdf)

<p style="text-align: center;"><b>System Dynamics workshop agenda 2019.</b></p> <p style="text-align: center;">A beginner's immersion course in systems thinking, systems analysis and system dynamics. From first question to finished simulation model.</p> <p style="text-align: center;"><i>Monday, July 1<sup>st</sup> – Wednesday July 3<sup>rd</sup> 2019, Freiburg</i></p>	
<b>Monday, July 1<sup>st</sup></b>	
9.00-11.00	<b>Professor Harald Sverdrup:</b> Introduction to systems thinking, systems analysis and system dynamics. What is it all about.
11.00-12.00	Short little practice of how to do a first causal loop diagram. Girl that runs
12.00-13.00	<b>Lunch</b>
13.15 -14.00	<b>Dr. Anna Hulda Ólafsdóttir:</b> On drawing causal loop diagrams, flow charts, and doing causal loop analysis. The basics of group modelling approaches that work. Group modelling. Defining the mission. Starting Causal loop diagramming and flowcharts
14.15-16.30	5 small cases; Undertake systems analysis yourself in small groups. Show your results on the whiteboard
16.30-17.00	Installing STELLA Architect trial on your computer
<b>Tuesday, July 2<sup>nd</sup></b>	
9.00-11.00	<b>Professor Harald Sverdrup:</b> Everything is possible. Using systems thinking, system analysis and systems analysis and system dynamics in education and research. Using system dynamics in industrial engineering and production control in cooperating companies during the last 100 years. A showcase from Norway
11.00-12.00	<b>Dr. Anna Hulda Ólafsdóttir:</b> Demonstrating STELLA
12.00-13.00	<b>Lunch</b>
13.00-16.00	<b>Professor Harald Sverdrup &amp; Dr. Anna Hulda Ólafsdóttir:</b> Red are the apples at Kivik Village. How to model an apple orchard's production of apple juice to be sold in bottles and whether it pays off or not. Sverdrup shows how to build the model; Flowcharts, causal loop diagrams, draw model interface drawing as a part of the planning. And then we build it. Harald first, and you follow and do the same. Until it works.
16.00-16.15	Questions about what we did so far.
<b>Wednesday, July 3<sup>rd</sup></b>	
10.00-11.20	<b>Dr. Anna Hulda Ólafsdóttir:</b> Using system dynamics for policy development. Work together on the Beer case example.
11.30-12.00	<b>Professor Harald Sverdrup:</b> Introduction to your first own system dynamics model project
12.00-13.00	<b>Lunch</b>
13.00-16.30	Build your first simple system dynamics model.
16.30-17.00	Show and explain your models and play with them