Marie Curie Initial Training Network
Adaptation to a New Economic Reality (AdaptEconII)
Coordinator: Kristin Vala Ragnarsdottir, University of Iceland

Twelve PhD positions for Early Stage Researchers (ESRs) are available at the University of Iceland (Reykjavik, Iceland), University of Stockholm (Stockholm, Sweden) and University Blaise Pascal (Clermont Ferrand, France). This is a Marie Curie Initial Training Network where students will obtain a joint PhD from two of the participating universities. In addition, each Early Stage Researcher will have a training period in a collaborating institution in the UK (New Economics Foundation; Schumacher Institute), Sweden (Swedish National Defence College) or Germany (Wuppertal Institute; Organization for Research in Business Economics-GWS).

This is an exciting training opportunity based on the observation that the present economic model of permanent growth is unstable and leads to cycles of growth, peaks and crashes. The training programme will contribute to developing new economic thinking based on knowledge of global resource availability. The Adaptation to a New Economic Reality (**AdaptEconII**) project is divided into three research themes: (1) *Sustainable resource management*; (2) *Integrated economic systems assessment*; and (3) *Integrating society and economics*. These themes will be combined to form an overarching economic model built on socio-environmental-technical (SET) system analysis of causal links and feedback structures and system dynamics. A simple prototype of such a model, WORLD, has already been built by the participants and it is tested on historical data.

All of the ESRs will be trained in system analysis and system dynamics in addition to conventional and biophysical economic paradigms. They will be presented with aspects of resource availability, links between resources and wealth, the rise of new and/or rediscovered values and realization of our interdependent world, new development paradigms, political and industrial ecology, as well as science for sustainable society. **AdaptEconII** will train 12 ESRs in new economic thinking and the goal is for them be at the forefront of innovative economic thinking in the EU and the world.

Each ESR will have a primary supervisor in the first university and a secondary supervisor at the second university. Member of staff at the participating organisations will join the supervisory team, if appropriate. Joint training will take part at the three universities and the participating organisations will contribute to the training. Fundamental to the training program is trans-disciplinary inter-linkage of system science, ethics for an interdependent world, natural science, and observation-based political science with biophysical economics. The ESRs will also be trained in transferable skills and each student will have a career development plan throughout the training period.

The 12 PhD studentships with title of project, research theme, objective, expected results, supervisors and secondment institution are outlined below:

Early Stage Research Project 1
Title of project: Assessing and modelling ocean fishery dynamics, sustainable levels of extraction with an emphasis on Iceland and the North Atlantic area.
Research theme: Sustainable Resource Management.
Objectives: Develop a conceptual semi-global ocean fish model in two steps. First a model using the Icelandic ocean space as a first testing case study. Build an operational systems dynamics based simulation model. Secure relevance by conducting group modelling with

Icelandic stakeholders (fishers, government, investors, consumers, environmentalists, researchers), including effects of climate change on ocean nutrient dynamics. Test on fishing data from the North Atlantic records. Later expand the model to cover the Arctic Sea and the North Atlantic, with a view towards addressing global issues.
Expected Results: A prototype for an assessment model based on systems dynamics, and a framework for using such models in policy inputs**.** Assessment of sustainable fishing quotas, fishing timing and geographical allocation of permits.
First supervisor: Dr Harald Sverdrup, Professor, Faculty of Industrial Engineering, Mechanical Engineering and Computer Science, University of Iceland.
Second supervisor: Dr. Peter Schlyter, Assistant Professor, Department of Department of Physical Geography and Quaternary Geology, University of Stockholm.
Secondment Institution: Dr. Paula Black, New Economics Foundation, London.

Early Stage Research Project 2
Title of project: Integrated energy model capturing sustainable energy development with a focus on Iceland as template.
Research theme: Sustainable Resource Management.
Objectives: Develop an integrated systems dynamics model for the production, distribution and use of energy in Iceland, looking at the short and specifically long term perspective, considering future demand and supply, as well as ways to supply a climate neutral energy system that contributes to sustainable development. The assessment tool developed should capture the essential basic of the energy system, and be simple to use in a policy and stakeholder setting. The model will include generic features that will be needed in other countries, with different input variables such as potentials for renewable sources of energy. Draw from earlier experiences from modelling national energy sourcing and use assessments using integrated assessments. Consider the need for adaption to already incurred climate change effects. Furthermore the model will be linked to indicators that illustrate if the system is developing according to principles of sustainable energy development and contributing to genuine progress.
Expected Results: Using Iceland as a well-defined island microcosm as a template for larger countries and regions. A quantitative long-term energy supply and demand model, parameterized for Iceland. A framework for models use in energy policy assessment. Energy scenarios with natural environment and national economy impact assessments.
First supervisor: Dr Brynhildur Davidsdottir, Professor, Environment and Natural Resources, Faculty of Economics and Faculty of Life and Environmental Sciences, University of Iceland.
Second supervisor: Dr Sylvie Ferrari, Professor, Observatory of Sustainable Development Representation (OR2D), and Research Unit in Theoretical and Applied Economics (GREThA), University Blaise Pascal.
Secondment Institution: Dr Maja Göppel and Dr. Philippe Scheppelmann, Wuppertal Institute, Berlin.

Early Stage Research Project 3
Title of project: Food, population and phosphorus in a sustainable society.
Research theme: Sustainable Resource Management.
Objectives: Combine a global population dynamics model with a food supply model, including effects of (1) soil erosion, (2) water supply and limitations, and availability of nutrients for growth, (3) phosphorus, and nitrogen, and (4) fossil fuels and energy to the degree this is relevant. The work will build on earlier work with the FoF model on the global scale and CONVERGE work done in Britain, Sweden, Southern India and Iceland. It will elaborate on causal links and include new important aspects like soils and climate change. Include possibilities to create a sustainable system for nutrients, water and soil. Consider the

need for adaption to already incurred climate change effects. Assess the effect of different population sizes and consumption patterns as well as strategies for nutrient conservation and recycling.
Expected Results: Integrated assessment for the food supply of Iceland the Nordic Countries for the next 10 centuries, as related to the global situation. Advanced version of the system dynamics-based FoF model (FoF-II). Energy scenarios with natural environment and national economic impact assessments.
First supervisor: Dr Kristin Vala Ragnarsdottir, Professor, Institute of Earth Sciences and Institute of Sustainability Studies, University of Iceland.
Second supervisor: Dr Ingrid Stjernquist, Associate Professor, Department of Department of Physical Geography and Quaternary Geology, University of Stockholm.
Secondment Institution: Dr Maja Göppel and Dr. Philippe Scheppelmann, Wuppertal Institute, Berlin.

Early Stage Research Project 4
Title of project: The global steel supply with respect to available resources, degree of loss, reuse, recycling and mobility of stocks-in-use.
Research Theme: Sustainable Resource Management.
Objectives: A systems dynamics model for steel supply and consumption, including market dynamics, price modelling and industrial development. Map stocks, reserves and flows according to the needs of the WORLD and GINFORS components of the SIMRESS model. Use either or some of all of Sweden, Germany, China and the globe as examples. Compile a proper reserves database, stratified into accessible and ultimately recoverable.
Expected Results: An integrated assessment of the German iron and steel supply, production, consumption and value generation in the long term. Strategy for sourcing iron for Germany in the future.
First supervisor: Dr Sylvie Ferrari, Professor, Observatory of Sustainable Development Representations and Research Unit in Theoretical and Applied Economics, University Blaise Pascal.
Second supervisor: Dr Harald Sverdrup, Professor, Faculty of Industrial Engineering, Mechanical Engineering and Computer Science, University of Iceland.
Secondment Institution: Mr Gert Ahlert and Mr Martin Distelkamp, both Diplom Econom, Organization for Research in Business Economics (GWS) Osnabrück.

Early Stage Research Project 5
Title of project: The transition to a bio-based and self-renewable economy in the Nordic countries, the issue of national and regional cooperation.
Research theme: Integrated Economics Systems Assessment.
Objectives: To develop a dynamic model for a bio-based economy based on stakeholder group modelling and causal loop systems analysis. Representative stakeholders will be selected. Consider the need for adaption to already incurred climate change effects. Create the foundation for building a system dynamics based simulation model. Using initially the Nordic Countries as the primary case study, with a view to include France and Germany in the future. Connect this to the national economies of Nordic Countries and issues of efficiency and resilience.
Expected Results: A sustainability assessment of a bio-based economy including the impact of climate change for Nordic Countries, Germany and France. Framework for assessing sustainability, efficiency and resilience in the long term.
First supervisor: Dr Ingrid Stjernquist, Associate Professor Department of Department of Physical Geography and Quaternary Geology, University of Stockholm

Second supervisor: Dr Sylvie Ferrari, Professor, Observatory of Sustainable Development Representations, and Research Unit in Theoretical and Applied Economics, University Blaise Pascal in collaboration with Dr. Brynhildur Davidsdottir (University of Iceland).
Secondment Institution: Dr Maja Göppel, Wuppertal Institute, Berlin.

Early Stage Research Project 6
Title of project: The dynamics of waste, pollution and material circularity in a biophysical economy.
Research theme: Integrated Economics Systems Assessment.
Objectives: Do systems analysis, applying flow-charting, mass balancing and mapping of causal links. Create input-output material, metal and energy tables and use dynamics for trade and services in the national and global economy, in such a way that resource use, energy use, waste generation and irreversible losses can be traced and integrated into the WORLD and SIMRESS models and global economic long term scenarios. Consider the need for adaption to already incurred climate change effects. Use Germany and France as case study.
Expected Results: Assessments of resource scarcity dynamics and assessment of waste and pollution as sources of resources for Germany or/and France as a case study.
First supervisor: Dr Arnaud Diemer, Associate Professor of Economics, Observatory of Sustainable Development Representations (OR2D) and Triangle: Action, discourses, economic and political thought (TRIANGLE), University Blaise Pascal, Clermont Ferrand.
Second supervisor: Dr Kristin Vala Ragnarsdottir, Professor, Institute of Earth Sciences and Institute of Sustainability Studies, University of Iceland.
Secondment Institution: Dr Jenneth Parker and Mr Ian Roderick MS, Schumacher Institute, Bristol.

Early Stage Research Project 7
Title of project: A global integrated energy system dynamics model for 1650-3500 AD.
Research themes: Integrated Economics Systems Assessment and Resource Management.
Objectives: Create a simple systems dynamics-based global energy simulation model for the macro-scale, including estimates and use of finite reserves and viable long-term renewable energy sources, with considerations of climate change effects. The assessment tool developed should be simple, capture the essential basic of the system without being overburdened by politically correct details, and be simple to use in a policy and stakeholder setting (after stakeholder selection). Consider different potential policy options and consumption patterns in a world of limited resources.
Expected Results: A global energy sustainability assessment model.
First supervisor: Dr Catherine Figuière, Professor of Economics, Observatory of Sustainable Development Representation (OR2D) and Center for Economic Research (CREG), University Blaise Pascal, Clermont Ferrand.
Second supervisor: Dr Brynhildur Davidsdottir, Professor, Environment and Natural Resources, Faculty of Economics and Faculty of Life and Environmental Sciences, University of Iceland.
Secondment Institution: Dr Paula Black, New Economics Foundation, London.

Early Stage Research Project 8
Title of project: An ontological reorientation of the economic basis in integrated assessment tools.
Research theme: Integrating Society and Economics.
Objectives: Sustainability requires economics to adopt a philosophical orientation that is different from the current mathematical mainstream. This project will address structures

and mechanisms governing current dynamics and directions of intended change. Reflexively inform and be informed by the other four PhD projects in this theme ensuring their models can have synergistic impact. Apply a pragmatic, nested and exploratory approach that connects human driving forces and economic and environmental dynamics.
Expected Results: Theory advancement and a methods toolkit enabling conceptual connectivity of **AdaptEconII** models with the planetary boundaries integrated modelling platform.
First supervisor: Dr Sarah Cornell, Research Coordinator, Stockholm Resilience Centre, University of Stockholm.
Second supervisor: Dr Catherine Figuière, Professor of Economics, Observatory of Sustainable Development Representation (OR2D) and Center for Economic Research (CREG), University Blaise Pascal, Clermont Ferrand.
Secondment Institution: Dr. Jenneth Parker and Dr Tom Henfrey, Schumacher Institute, Bristol.

Early Stage Research Project 9
Title of project: Modelling the social system interaction with local and global population economy and the social dynamics.
Research theme: Integrating Society and Economics.
Objectives: Proper system analysis of social dynamic in the ways it affects the economy. Effects of values and standards, social trust, alignment of agendas and perceived demands and needs. In reality, events in the economic system are determined by minds and behaviours, and to some extent this must be reflected in how the economy is controlled, governed and operated. Consider the need for adaption to already incurred climate change effects. Map how these aspects connect through causal links to decision-making and the new economy.
Expected Results: A first generation conceptual model where social dynamics are linked to new biophysically linked economics, based on systems analysis.
First supervisor: Dr Sarah Cornell, Research Coordinator, Stockholm Resilience Centre, University of Stockholm.
Second supervisor: Dr Arnaud Diemer, Associate Professor of Economics, Observatory of Sustainable Development Representations (OR2D) and Triangle: Action, discourses, economic and political thought (TRIANGLE), University Blaise Pascal, Clermont Ferrand.
Secondment Institution: Dr. Jenneth Parker and Dr Tom Henfrey, Schumacher Institute, Bristol.

Early Stage Research Project 10
Title of project: Corruption crime, trust, honesty, democracy and the causal connections with the new biophysical economy.
Research theme: Integrating Society and Economics.
Objectives: Analyse the linkages between social trust, the rule of law, democracy, corruption, legitimacy and other contextual factors with the biophysical resource base. A first generation conceptual model of how new biophysical economics may be affected by social trust, rule of law, democracy, and other contextual factors. Proposal for the structure and design of a system dynamics-based model. Use group modelling with chosen stakeholders and Nordic policymakers for conceptual mapping of situations and situations handling. Connect this to the national economy of Nordic Countries and issues of efficiency and resilience.
Expected Results: The systems analysis basis for building a regional and global power hegemony model. A framework for great power politics assessment for a sustainable future, assessing options and risks.

First supervisor: Dr Kristin Vala Ragnarsdottir, Professor, Institute of Earth Sciences and Institute of Sustainability Studies, University of Iceland.
Second supervisor: Dr Ingrid Stjernquist, Associate Professor, Department of Department of Physical Geography and Quaternary Geology, University of Stockholm.
Secondment Institution: Dr Thomas Ries, Associate Professor, Swedish National Defense College, Stockholm.

Early Stage Research Project 11
Title of project: The new race on resources, resource security and Big Power resource politics in new biophysically based economy.
Research theme: Integrating Society and Economics.
Objectives: Assessing strategic resource scarcity horizons and major actor competition/conflict potential. Develop medium to long-term resource strategies in a new biophysically constrained economy, drawing on earlier research in hegemonial power dynamics, power relations, and national resource competition between great powers. This assessment will include the influence of future climate change and population dynamics and demographic aspects. Nordic countries will be used as a case for analysing impacts on economics and issues of efficiency and resilience.
Expected Results: A first generation resource intelligence system for long term-assessment and planning. Proposal for the structure and design of a system dynamics-based model.
First supervisor: Dr. Peter Schlyter, Assistant Professor, Department of Physical Geography and Quaternary Geology, University of Stockholm.
Second supervisor: Dr Harald Sverdrup, Professor, Faculty of Industrial Engineering, Mechanical Engineering and Computer Science, University of Iceland in collaboration with Dr Thomas Ries (SNDC, Stockholm).
Secondment Institution: Dr Thomas Ries, Associate Professor Swedish National Defense College, Stockholm.

Early Stage Research Project 12
Title of project: Growth, de-growth, ecology, political ecology and the future.
Research theme: Integrating Society and Economics.
Objectives: Develop the paradigm to be applied in running a society, a business environment and an economy of decreasing size with maintained service provision, sense of sufficiency and life quality. Address challenges for democracy and accountable states. Considering climate change and demographic challenges, using France or Sweden as case studies.
Expected Results: Strategies for the future in policy development, business strategies and change in economic science and political science education.
First supervisor: Dr Arnaud Diemer, Associate Professor of Economics, Observatory of Sustainable Development Representations (OR2D) and Triangle: Action, discourses, economic and political thought (TRIANGLE), University Blaise Pascal, Clermont Ferrand.
Second supervisor: Dr. Peter Schlyter, Assistant Professor, Department of Department of Physical Geography and Quaternary Geology, University of Stockholm.
Secondment Institution: Mr Gert Ahlert and Mr Martin Distelkamp, both Diplom Econom, Organization for Research in Business Economics (GWS) Osnabrück.

Note that according to the rules of the European Commission, a PhD student cannot have a first supervisor in his/her county of origin.

Interested applicants please send in an application to vala@hi.is with "**AdaptEconII** application" in the subject line of the email. Applicants are asked to outline in the application letter the competence they have in the relevant core topics used in the training:

system science, natural science, political science, and economics. Please include certificates of undergraduate and masters level degrees with the application as well as names of 2 referees. This is a transdisciplinary training program and candidates from all backgrounds will be considered. Each applicant is invited to apply for 3 ESR projects, ranking them according to preference. Further information about the training program can be obtained from the **AdaptEconII** coordinator, Kristin Vala Ragnarsdottir, University of Iceland (vala@hi.is).

Application deadline is August 31, 2015. Applicants need to have completed a masters degree (or equivalent) prior to starting the training programme. All applicants will first be selected by the **AdaptEconII** team and then evaluated by relevant university PhD committees. Short listed candidates will be interviewed over Skype or similar IT arrangements. Notification of success will be in October. All applicants will get a response.

The PhD studentships will start either January 1, 2016 (ERSs 1, 3, 4, 5, 8, 10, 12) or March 1, 2016 (ESRs 2, 6, 7, 9, 11). Each ESR will obtain a living allowance, determined by the European Commission, of 3110€ (from which national insurance, pensions and taxes will be deducted according to county rules) which is subject to currency exchange in the Nordic countries. The living allowance is adjusted according to cost of living in the university city of the first supervisor. Each student will typically spend 18-24 months at the first university, 6-12 months at the second university, and 3-6 months at a participating organisation. In signing a training contract, each ESR is committed to spend training time at all three institutions that is defined for each project. Funding for each PhD student is for 3 years and no compensation is given for moving between institutions. The living allowance for each student will be paid through the institution of the first supervisor for all 3 years of training.