

Dear all

This week we have for you:

- A job opportunity for a Groundwater Modeller at ESR in New Zealand
- Invitation to participate in the AGU session *MultiSector Dynamics: Science & Modeling for Societal Transformations*
- MultiSector Dynamics Community newsletter for July (attached as a PDF)

If you would like something included in this digest please email it to office@mssanz.org.au

kind regards, Karen

Groundwater Modeller – ESR New Zealand

Groundwater Modeller

Full time Permanent

Christchurch

Institute of Environmental Science and Research Ltd (ESR)

About ESR

ESR is a Crown Research Institute, working with and for clients and stakeholders to deliver enhanced scientific research services for the economic, environmental and social wellbeing of New Zealand. ESR has approximately 400 staff with sites across New Zealand.

We are currently seeking someone with a great attitude and the skills to match to take up a permanent fulltime role within our Groundwater team in Christchurch.

Your new role

Reporting to the Groundwater Manager, you would be responsible for carrying out research into groundwater modelling and assisting other members of the groundwater team in modelling aspects of a range of groundwater contamination research projects.

What you'll need to succeed

We are seeking a highly motivated, team-focused researcher with expertise in groundwater modelling for a permanent position. Applicants will have a post-graduate degree with experience in groundwater contamination investigation and research.

The ideal candidate will have the following:

- A PhD degree in groundwater modelling or closely related engineering or scientific field.
- Experience in groundwater modelling research. Consultancy experience would be an advantage.
- Capability to develop groundwater flow and contaminant fate and transport models, using novel approaches which may require the development of new techniques.
- Experience developing code in Python, Fortran or similar, for linking models, and processing input data and model outputs.
- Experience undertaking model parameter and predictive uncertainty analysis, and using the parameter estimation software PEST.
- High level of commitment and motivation to publishing research results at high impact journals.
- GIS skills would be an advantage.

What you'll get in return

You will get to work with a passionate team, who take pride in the quality of their work and have the opportunity to carry out cutting edge research in modelling of groundwater contamination and mitigation processes. You will also get to be part of a very unique institution that supports the wellbeing of the community and wider New Zealand.

ESR promotes active work/life policies including family-friendly initiatives and flexible hours. You'll receive ongoing personal development, free car parking as well as access to a Southern Cross group membership scheme.

To Apply

Apply on line at <https://www.careers.sciencenewzealand.org/esr/esr-jobs>

The position description is attached in a PDF file.

Please note the successful applicant will be required to complete a pre-employment drug-screen and police records check as conditions of employment

Dear Colleagues:

We are excited to invite your participation in our AGU session entitled "MultiSector Dynamics: Science & Modeling for Societal Transformations". The session abstract and details are provided below. (apologies for cross posting)

Invited Speakers:

1. [Elke Weber](#), Princeton University, US National Academies of Science: *How do real human behaviors & risk attitudes shape societal transformations for sustainability and climate change?*
2. [Nidhi Kalra](#), RAND Corporation, Former Science Advisor to US Senator Kamala Harris: *Can model-based science inform the policy transformations needed to advance automation in transport systems and manage its impacts on climate change?*

This session is part of a broader [MSD community of practice \(CoP\)](#) that has been emerging over the last two years across a diverse array of researchers and institutions. Overall the MSD CoP will be hosting a Town Hall, a Union Session, and several Technical Sessions (see page 5 of the attached MSD Newsletter). We are seeking broad participation in our sessions and please feel free to [sign up for more MSD CoP information updates](#).

Key Dates:

1. Abstract Submission Deadline: July 29, 2020
2. Conference Registration: August 2020
3. Abstract Decisions: October 2020
4. Remote Conference Dates: December 7-11, 2020

Session Title: MultiSector Dynamics: Science & Modeling for Societal Transformations

Section: Global Environmental Change

View Session Details: <https://agu.confex.com/agu/fm20/prelim.cgi/Session/101618>

Societal goals such as enhancing ecological resilience, achieving the Millennium Development Goals, and managing risks from climate change involve major transitions in integrated systems (water, transport, energy, etc.). These challenges require dynamic and adaptive action pathways that balance diverse societal objectives and account for complex feedbacks, uncertainties, and thresholds (e.g., ecological tipping points). The session seeks to develop a [MultiSector Dynamics \(MSD\)](#)

[community](#) focused on advancing our understanding of the co-evolution of human and natural systems over time and developing the next generation of tools needed to support major societal transformations. MSD research occurs within a perspective that bridges sectors (e.g., energy, water, land, transportation, economy, etc.) and scales (spatial, temporal, and institutional) to better understand coupled human and natural systems. This session broadly invites submissions addressing these challenges and contributing promising new modeling tools.

Cheers,
Pat, Jen, Enayat, and Jan

POSITION DESCRIPTION

Position Title:	Groundwater Modeller, Senior Scientist or Scientist
Location:	CSC
Group:	Groundwater
Pay Group:	Science
Reports to:	Manager, Groundwater

ABOUT ESR

ESR is a Government-owned Crown research institute (CRI) that uses the power of science to solve complex problems for our partners and customers and protect people and products in New Zealand, and around the world.

Our mission is 'keeping communities safe, healthy and prosperous through smart and sustainable science'.

Our Vision:

ESR is recognised the world over as leaders in the rapidly evolving fields of forensic, health and environmental sciences, known for ground-breaking methods and technologies that keep people safe, healthy and prosperous. As the touch point for New Zealand and international customers, ESR is sought after to provide innovative and high quality science solutions using leading-edge research and state-of-the-art laboratories. Customers regard ESR as a critical partner in their success through ESR's service ethic and commitment to their objectives. ESR is a magnet for talented and aspirational professionals who are appreciated, supported and proud of their work

ESR Values:

- [Our team spirit](#) (*Mahi Tahi*) *Great people working together as one team*
- [Our quality counts](#) (*Mahi rangatira*) *Standing out through our excellence and world class expertise*
- [We do the right thing](#) (*Mahi pono*) *Upholding integrity and independence no matter what*
- [We push boundaries](#) (*Mahi auaha*) *Meeting challenges with fresh thinking and creative approaches*

POSITION PURPOSE

This position may be at the Scientist or Senior Scientist level depending on the candidate's expertise and experience.

The Scientist level includes those currently called Research Associates. They may receive supervision from a more experienced scientist. At the completion of training they will be responsible for planning and directing components of a project or case and may independently manage small projects or cases.

This Senior Scientist level includes Service Description Leaders, Project Leaders, Forensic Service Centre Scientists, Analytical Laboratory Forensic Scientists and Laboratory Managers. The position holder has demonstrated success in research, service delivery or Forensic Specialist expertise.

AREAS OF RESPONSIBILITY

ACCOUNTABILITIES	DELIVERABLES
Service Delivery	<p>Scientist Level:</p> <ul style="list-style-type: none"> • Will communicate results through authorship or co-authorship of scientific publications, reports or statements • May have significant contact with clients and will write client reports <p>Senior Scientist level:</p> <ul style="list-style-type: none"> • Works independently in service delivery, casework or research activities

ACCOUNTABILITIES	DELIVERABLES
	<p>and has recognised ability in their specialist area, by colleagues on other ESR sites or clients</p> <ul style="list-style-type: none"> • Will generally be expected to write major client reports and/or publish in peer reviewed scientific journals, and present work via oral presentations at conferences • May be required to give opinion evidence as an expert witness • May be expected to obtain funding for research activities • Has significant contact with clients, end users and communities • May act as an adviser or consultant in a specialist area.
Scientific Expertise	<p>Scientist Level:</p> <ul style="list-style-type: none"> • Have significant input into the planning, execution and reporting of established research projects • Will generally use established methods, or may modify/develop methods in consultation with a more Senior Scientist/Project Leader • May have an area of specific expertise • May supervise technical staff and be involved in their training. <p>Senior Scientist level:</p> <ul style="list-style-type: none"> • Can manage all aspects, including financial of a significant project(s) or case(s) • May supervise technical staff, less experienced scientists and/or students • Understands the wider aspects of managing scientific activities in an organisational setting.
Science Innovation & Research	<ul style="list-style-type: none"> • As an individual researcher carries out complex or novel projects which may require the development of new techniques • Participates in wider ESR forums in relation to research development activities. • Understands the wider aspects of managing scientific activities in an organisational setting. • Will present work at conferences.
Quality & Compliance	<ul style="list-style-type: none"> • May peer review colleagues' work.
	<ul style="list-style-type: none"> •
Health & Safety	<p>As a staff member of ESR you will ensure you:</p> <ul style="list-style-type: none"> • Take reasonable care that your acts or omissions do not adversely affect the health and safety of yourself or other persons • Be familiar with, comply and follow any reasonable instruction relating to ESR's Health & Safety policies, procedures and any relevant legislation and regulations • Actively participate in ESR Health & Safety processes and activities including, but not limited to, induction, training, risk management & reporting

KEY WORKING RELATIONSHIPS

Internal:

- Senior Science Leader Groundwater team
- Groundwater team
- ESR Staff

External:

- Research colleagues in other CRIs & universities
- Regional Council staff
- Commercial clients

DELEGATED AUTHORITY

As per delegated authorities policy.

ESSENTIAL EXPERIENCE AND TECHNICAL SKILLS

Educational Requirements:	<ul style="list-style-type: none"> The position is usually held by a person with an appropriate postgraduate qualification and has significant experience as recognised by their peers and clients at a national level.
Technical competencies and Experience required:	<ul style="list-style-type: none"> In depth knowledge of industry standard groundwater modelling software. Research experience in groundwater contamination and investigation. Ability to develop groundwater flow and contaminant transport models at local and regional scales. Ability to pre and post process model inputs and outputs and undertake parameter and predictive uncertainty analysis. Ability to lead and direct groundwater modelling projects in research and consultancy contexts. Desirable to be able to develop commercial income from contracts that will use both their individual skills and those of ESR's Groundwater team.

BEHAVIOURAL COMPETENCIES

BEHAVIOURAL COMPETENCY	FOCUS AREAS – Other Tier 4 level
Being commercially astute	<ul style="list-style-type: none"> All research and science activities will add value to our clients and New Zealand's economic outcomes and ensure ESR's financial viability.
Communication (Organisational and Client)	<ul style="list-style-type: none"> Ensures people are kept informed and encouraged to express constructive views and opinions.
Delivering a Continually Improving Service	<ul style="list-style-type: none"> Is able to link the daily work to overall service objectives and deliver continually improving results.
Delivering the Service	<ul style="list-style-type: none"> Takes a methodical approach to work, prioritises tasks effectively, and consistently meets deadlines in order to provide an excellent service.
Empowering Our people and Building Capability	<ul style="list-style-type: none"> Is enthusiastic, ambitious, determined, and confident to challenge, ensuring high levels of personal and service achievement.
Innovation	<ul style="list-style-type: none"> Has the ability to develop new methods and introduce new ideas Uses originality of thought and imagination.
Making Informed Decisions	<ul style="list-style-type: none"> Ensures decisions are linked to operational objectives and improvement.
Managing the Stakeholder Relationship	<ul style="list-style-type: none"> Understands the need to work together with the stakeholder.
Providing Excellent Customers Service	<ul style="list-style-type: none"> Maintains a professional approach and presents a positive image to internal and external people when representing self and ESR Makes every effort to ensure the experience clients have of ESR is positive and productive.
Setting & Achieving Ambitious Targets	<ul style="list-style-type: none"> Is enthusiastic, ambitious, determined, and confident

BEHAVIOURAL COMPETENCY	FOCUS AREAS – Other Tier 4 level
	to challenge, ensuring high levels of personal and organisational achievement <ul style="list-style-type: none"> • Has stamina and willpower to deliver results.
Technology knowledge	<ul style="list-style-type: none"> • Possesses credible technical knowledge and expertise relevant to the role, keeps this up to date and can apply and transfer this to the work programme and others.
Working in Partnership	<ul style="list-style-type: none"> • Works well with colleagues in the team and the service to get things done and contributes to a positive team spirit.

This position description is subject to review from time to time

MultiSector Dynamics Community

Welcome to the newsletter of the MultiSector Dynamics Community

INSIDE THIS ISSUE

- [Community engagement through our website](#)
- [Three newly established MSD Working Groups](#)
- [Researcher highlight: Yanyan Cheng](#)
- [MSD sessions at AGU 2020](#)
- [MSD job listings](#)
- [MSD publications](#)

Hello MultiSector Dynamics (MSD) Community!

In this issue we're introducing the three newly established MSD Working Groups: *MultiSector Impacts of Energy Transitions*, *Urban Systems*, and *Professional Development and Education for Early Career Scientists*. We are also featuring the work of Yanyan Cheng (PNNL) on the inclusion of perennial bioenergy crops in land surface models.

Finally, we present the sessions organized by members of our community in this year's AGU Fall Meeting.

www.multisectordynamics.org

Community engagement through our website

We would like to remind you that the website for our community of practice is now fully functional at www.multisectordynamics.org.

We will be transitioning all our future communications and distributed materials to this website. In an effort to simplify operations as our community grows, **the current mailing list is being phased out so we invite everyone to register with the website to continue to receive future communications from us.** By joining, you can also register your interest with our current and future working groups.

[Register here](#)

Three newly established MSD Working Groups

Following the latest request for Working Group proposals, three new WGs have been established:

Professional Development and Education for Early Career Scientists

Description

As the MSD community is formed and begins to grow, this Working Group will seek to expand participation among a diverse group of early career scientists, provide professional development opportunities to graduate students and post-docs, and serve as a contact point for interdisciplinary education activities taking place in the MSD community. The overarching goal of this group is to support early career success in the field, which we believe will in turn support the scientific vision of MSD. Specific activities include planning workshops for early career faculty and completing an inventory of MSD-related coursework at U.S. universities.

Co-chairs



Ana Dyreson, Michigan Technological University

Tom Wild, University of Maryland

MultiSector Impacts of Energy Transitions

Description

Technological advancement and energy & environmental policy have driven rapid changes in the energy sector, and these developments have pervasive influence on other economic sectors and natural systems. As these developments accelerate, there is an increasing need to understand the resulting feedbacks between human and natural systems. This Working Group will advance the understanding of these multisectoral relationships by building a diverse team to identify what feedbacks, sectors, and societal constructs are missing from existing analytical approaches and define new research pathways towards a more holistic understanding of the multisector impacts of energy transitions.

Co-chair



Stuart Cohen, National Renewable Energy Laboratory

Marshall Wise, Pacific Northwest National Lab

Urban Systems

Description

Cities are a key focal point for addressing questions related to system dependencies, tipping points, and uncertainties. Cities are also a fruitful context to explore model coupling across sectors and scales. However, efforts to combine multi-sector urban tools and insights to examine key uncertainties, interactions, and tradeoffs are still nascent. The urban working group will facilitate the development of these tools and ideas. We will explore questions like: What are the risks faced by the world's urban areas as they seek to increase resilience and balance multiple objectives such as human health, economic development, and sustainable use of resources? How does urban change influence larger-scale infrastructure, economic, and Earth system processes, and how is urban evolution constrained by these larger systems? Which processes and couplings must be represented to understand multi-sector dynamics within cities?

Co-chairs



Andrew Jones, Lawrence Berkeley National Lab (LBNL)

Christa Brelsford, Oak Ridge National Lab (ORNL)

Researcher Highlight: Yanyan Cheng



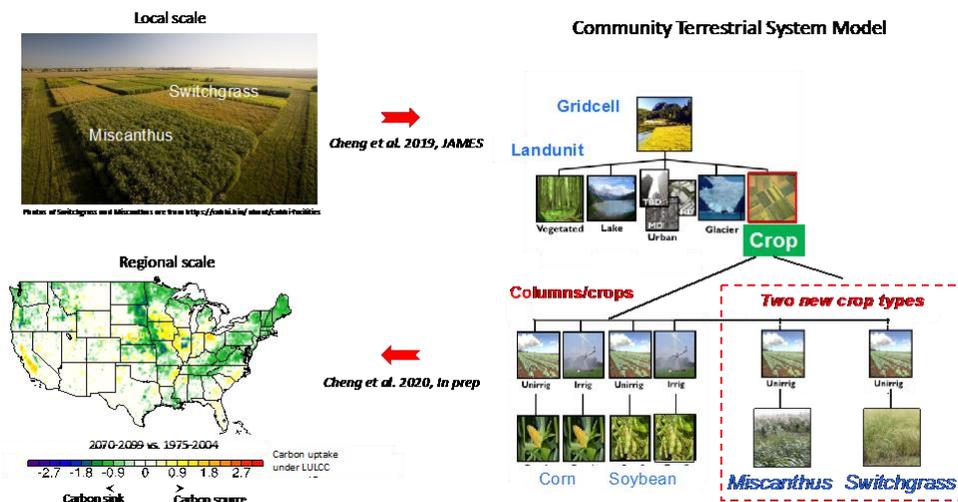
Yanyan Cheng

Yanyan Cheng is a hydrologist and land surface modeler working on complex energy-water-land dynamics. She is currently a Postdoc at the Pacific Northwest National Laboratory (PNNL) in the Atmospheric Sciences and Global Change division. She earned a PhD in hydrology and water resources engineering from the University of Wyoming in 2018.

Yanyan's research focuses on the development and application of hydrological and land surface models to explore the complex interactions among land use and land cover changes (LULCC), vegetation dynamics, and hydrology in agro-ecosystems.

During her PhD, she developed a physically-based, distributed, hyper-resolution hydrologic model named "[PFPMoD](#)" to investigate how preferential flow influences hydrological behaviors in tropical catchments (e.g., Panama). This work was the first attempt to explicitly incorporate preferential flow into hydrological models at catchment scales and has been featured in American Geophysical Union (AGU) Magazine Eos as [an AGU Research Spotlight](#). She further applied PFPMoD to examine the effects of [land use dependent preferential flow on water provisioning in the Panama Canal Watershed](#).

Her current research at PNNL aims at improving the capability of land surface models to represent key missing vegetation types (e.g., perennial bioenergy crops) and hydrological processes (e.g., preferential flow) to investigate water, energy, and carbon cycle dynamics associated with LULCC across various scales. Recently, she has implemented two new perennial bioenergy crops (Miscanthus and switchgrass) into one of the most widely used land surface models, the Community Terrestrial System Model (CTSM; formerly known as the Community Land Model [CLM]) with comprehensive validation against site-level measurements, which constitutes the first attempt to explicitly simulate perennial bioenergy crops in CTSM (<https://github.com/ESCOMP/CTSM/releases/tag/ctsm1.0.dev097>). The local-scale results indicate that these two high-yield perennial crops assimilate more CO₂ while demand less nutrients and water than traditional annual crops, which are promising alternatives for biofuel feedstocks. With this enhancement, CTSM becomes one of the first land surface models that can evaluate how energy technology advances (such as potential future biofuel expansion) could influence the complex energy-water-land-climate dynamics at local, regional, and global scales.



She also comprehensively validated CTSM over the Contiguous United States (CONUS) during the historical period against various datasets to examine the capability of CTSM in simulating water and carbon cycle dynamics at regional scales, with a particular focus on identifying model shortcomings related to model structure, parameterization, and agricultural management practices, which could inform future model development. Working with colleagues at PNNL and NCAR, her most recent work focuses on developing an integrated multi-sector and multi-scale modeling framework (Global Change Assessment Model [GCAM]-Demeter-CTSM) to investigate how future biofuel expansion could influence water availability and quality over the CONUS.

Yanyan is co-convening an AGU session on [Advances in Understanding Impacts of Land Use and Land Cover Change in a Changing Climate Using Earth System Records and Models](#) this year. The session's conveners sincerely welcome the MSD community's submissions and collaborations.

Highlighted articles:

- Cheng, Y. et al. (2019). [Parameterizing perennial bioenergy crops in Version 5 of the Community Land Model based on site-level observations in the Central Midwestern United States](#), *Journal of Advances in Modeling Earth Systems*
- Cheng, Y. et al. (2018). [Land use dependent preferential flow paths affect hydrological response of steep tropical lowland catchments with saprolitic soils](#), *Water Resources Research*.
- Cheng, Y. et al. (2017). [Earthworms and tree roots: A model study of the effect of preferential flow paths on runoff generation and groundwater recharge in steep, saprolitic, tropical lowland catchments](#), *Water Resources Research*.
- Cheng, Y. et al. (2019). [Characterization of sudden and sustained base flow jump hydrologic behavior in the humid seasonal tropics of the Panama Canal Watershed](#), *Hydrological Processes*.

MSD community sessions at AGU's Fall Meeting 2020

The following sessions are being convened by members of our community at this year's AGU conference:

Session	Conveners	Abstract and more information
<i>U007 - Modeling MultiSector Dynamics to Inform Adaptive Pathways</i>	Nathalie Voisin (PNNL), Klaus Keller (Penn State), Yoshihide Wada (IIASA)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/102348
<i>GC058 - MultiSector Dynamics: Science & Modeling for Societal Transformations</i>	Pat Reed (Cornell); Jennifer Morris (MIT); Enayat Moallemi (Deakin U); Jan Kwakkel (TU-Delft)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/101618
<i>IN030 - MultiSector Dynamics: Adopting FAIR Data Standards</i>	Casey Burleyson (PNNL), Adam Schlosser (MIT), Allen Lee (ASU), and Chris Vernon (PNNL)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/103821
<i>GC057 - MultiSector Dynamics: Modeling Advances for Representing Adaptive Human Systems Response to Change</i>	Jim Yoon (PNNL), Patricia Romero-Lankao (NREL), Christian Klassert (UFZ), Evelina Trutnevte (University of Geneva)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/102850
<i>GC059 - MultiSector Dynamics: Uncertainty Characterization for Coupled Natural-Human Systems</i>	Vivek Srikrishnan (Penn State), Jonathan Lamontagne (Tufts), Andrea Castelletti (Politecnico di Milano), Stefano Galleli (Singapore SUTD)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/103835
<i>GC054 - Multi-Sector Dynamics: Urban System Interactions and Resilience</i>	Andrew Jones (LBNL), Christa Brelsford (ORNL), James Rising (London School of Economics), Anu Ramaswami (Princeton)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/105523
<i>GC055 - MultiSector Dynamics: Energy-Water-Land Interactions at Multiple Scales</i>	Tom Wild (PNNL/UMD), Zarrar Khan (PNNL), Adriano Vinca (IIASA), Makoto Taniguchi (RIHN)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/105185
<i>GC056 - MultiSector Dynamics: linking physical and human system dynamics</i>	Abigail Snyder (JGCRI), Kalyn Dorheim (St. Olaf College), Alexander C. Ruane (NASA Goddard), Yan Li (Beijing Normal University)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/104792
<i>GC040 - Extreme Events, Climate Change and Urban Systems</i>	Deeksha Rastogi (ORNL), Melissa R Allen-Dumas (ORNL), Kuldeep R Kurte (ORNL)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/103877
<i>GC008 - Advances in Understanding Impacts of Land Use and Land Cover Change in a Changing Climate Using Earth System Records and Models</i>	Dan Li (BU), Edouard Davin (ETH), Yanyan Cheng (PNNL)	https://agu.confex.com/agu/fm20/prelim.cgi/Session/101664

MSD job listings

Our website is now featuring a [careers page](#) that will list available MSD-focused positions at all ranks. If you'd like to post a position to be featured in this page, please email us at: contact@multisectordynamics.org.

Currently, we have the following position posted:

Postdoctoral Scholar: Risk- and Decision-Analysis to Inform Flood-Risk Management

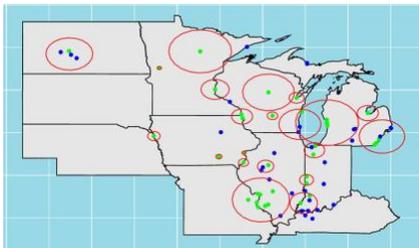
The Earth and Environmental Systems Institute (EESI) at The Pennsylvania State University invites applications for a Postdoctoral Scholar position focusing on the analysis of flood risks and strategies to manage these risks. The successful candidate will join a transdisciplinary research team supported by funding from sponsors such as The Department of Energy (DOE) and The National Oceanic and Atmospheric Administration (NOAA). The ideal candidate will have a strong background in a relevant discipline such as applied mathematics, statistics, atmospheric science, geosciences, civil and environmental engineering, or operations research. A Ph.D. in a relevant field is required by the start date.

[Read more](#)

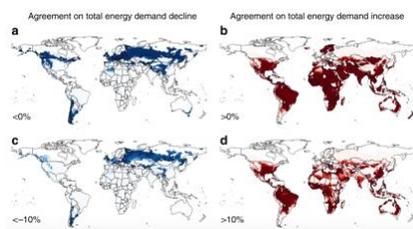
MSD publications

We have been posting and will be regularly updating select MSD publications on the website, under the [Publications](#) page. If you have any publications you would like us to highlight, please email contact@multisectordynamics.org.

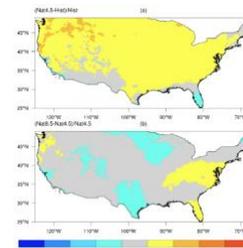
Below you can find some of the publications posted most recently:



[Fine-Scale Analysis of the Energy–Land–Water Nexus: Nitrate Leaching Implications of Biomass Cofiring in the Midwestern United States](#)



[Amplification of future energy demand growth due to climate change](#)



[River Regulation Alleviates the Impacts of Climate Change on U.S. Thermoelectricity Production](#)

This newsletter has been edited by Antonia Hadjimichael and the Community of Practice Facilitation Team. This and all previous newsletters can be accessed at the [Newsletters](#) page of our website. If you have any suggestions, concerns or other feedback about this newsletter or the MSD website, please email contact@multisectordynamics.org.