

Summary reports of CODATA Task Groups Progress, 2018-20(21)

Task Group on Fundamental Constants (TGFC)

Liaisons, Toshihiro Ashino and Richard Hartshorn

The task group TGFC, chaired by Dr. David Newell and Prof. Prof. Krzysztof Pachuck, achieved an important milestone in 2019, re-definition of kilogram. From 20th May, 2019, kilogram is defined by CODATA recommended value of Planck constant. Kilogram had been the last basic unit in the SI metric system which had been defined by physical prototype. After this, TGFC is transitioning their membership to meet the new challenges of determining the best values and uncertainties of the fundamental constants in the revised SI.

They published two articles about the CODATA 2017 values, [“The CODATA 2017 values of h, e, k, and N_A for the revision of the SI.”](#) and [“Data and analysis for the CODATA 2017 special fundamental constants adjustment.”](#) in 2018. The revised wall chart and wallet card have been made available at <https://physics.nist.gov/cuu/Constants/index.html> in 2019. Publications about the 2018 CODATA adjustment of the fundamental constants are prepared. They had meetings in July and November 2018, May and October 2019 and they are planning further meetings but investigating new venues which are appropriate to the new challenges.

Task Group on FAIR Data for Disaster Risk Research

Liaisons, Virginia Murray and Paul Uhlir

This Task Group (TG) is led by four co-chairs: Dr. Bapon Fakhruddin, Tonkin & Taylor International, NZ; Prof. Nina Frolova, Seismological Center of the Institute of Environmental Geosciences, Russian Academy of Sciences, RU; Prof. Guoqing LI, Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences, CN; and Prof. Carol Song, Purdue University, US.

In 2019, the TG published a white paper on “Next Generation Disaster Data Infrastructure”, a Policy Brief “Disaster Loss Data in Monitoring the Implementation of the Sendai Framework”, and a monthly “Disaster Risk Reduction and Open Data” Newsletter. The TG supported an ongoing National Disaster Management Office in China with Rapid Disaster Mapping for four disaster events in Bangladesh, Indonesia, Mozambique, and Solomon Islands. The TG organized a meeting of the group at RADI and some members participated and gave presentations at scientific conferences in AU, AT, and CN.

TG PASTD

Liaisons, Daisy Selematsela and Ernie Boyko

Report for the VGA on the work of the CODATA Task Group on Preservation of and Open Access to Scientific & Technical Data in/for/with Developing Countries

This task group promotes strategy, policy and institutional guidelines for implementation of open data principles in developing countries, especially in low- and middle-income countries (LMIC). They provide an interdisciplinary forum for enhancing capacity building and sharing best practice in developing countries, advance data publishing in developing countries and strive to enhance data re-use and repositories in support of sustainable development. Their major achievement was establishing and supporting Global Change Research Data Publishing and Repository (www.geodoi.ac.cn) (in DOI:10.3974) /Infrastructure & best practices. It has been certified by Repository Finder led by the American Geophysical Union (AGU), September 2019. In February 2020 in response to the COVID-19 pandemic, PASTD and The Consultant Committees on Communication and Information Technology (CCIT) and Life Sciences and Human Health (CCILH) of China Association for Sciences and Technology (CAST) for the United Nations jointly initiated COVID-19 Knowledge & Data Hub immediately. (<http://geodoi.ac.cn/covid-19/en/index.aspx>). Their proposal for the next year is to continue work on COVID-19 Knowledge and Data Hub engaged in GEO and UNESCO Covid-19 response program, jointly organize an online workshop of IGF 2020 on Big Data Governance for Public Health in November together with TG members, UNESCO, WFEO and Germany CODATA, carryout a workshop and training course on open data in mountain region, December 2020, Nepal, with ICIMOD. They are in the second round of discussions with co-organizers. They are also planning an International Training Workshop on Earth Observation for Sustainable Development in Developing Countries in Dec.2020; They plan to enhance the partnership on online services of Global change research data publishing and repository (GCdataPR), and are planning a special issues of the Journal of Remote Sensing on Asia Oceania the task group will contribute to mountain and terrestrial aspects as co-editors.

DRUM (Digital Representation of Units of Measure) Task Group

Liaisons, Richard Hartshorn and Simon Cox

The Digital Representation of Units of Measure (DRUM) has been identified as a critical tool in facilitating the automated interpretation and use of stored data. Indeed, units are things that are so fundamental and ingrained to scientists that they are often barely noticed, represented in different ways within files and databases, and perhaps even inferred from experience. Unfortunately computer software can often struggle with such challenges. The DRUM Task Group seeks to address this in an interdisciplinary manner by involving scientific union members of the International Science Council, and working with the International Bureau of Weights and Measures (BIPM). With the support of the CODATA Secretariat and in liaison with the ISC, the TG will approach International Scientific Unions/Associations in order to do the following:

1. Make the case for the importance of digital units of measure;
2. Invite an ‘ambassador’ from each Union / Association to be the point of contact for DRUM and engage with the TG;
3. Where appropriate, the ‘ambassador’ will be proposed also to be the liaison with BIPM and nominated for an important workshop on the Digital SI;
4. Invite the Union to present use cases that demonstrate the utility and importance of digital representation of units of measure, or illustrate pain points.

Advanced Mathematical Tools for Data-Driven Applied Systems Analysis Task Group

Liaisons, John Broome and Alena Rybkina

The [‘Advanced Mathematical Tools for Data-Driven Applied Systems Analysis’ Task Group](#) commenced activities in 2019 under the leadership of Professors Fred Roberts and Igor Sheremet. The objective of the group is to develop an advanced mathematical toolkit for the wide spectrum of applied systems analysis problems that we can expect to face in the near future while building a global digital economy.

During 2019, among the principal activities were planning for a joint IIASA/CODATA Workshop and conducting research studies which resulted in 12 scientific publications by task group members in the field of mathematics and systems analysis.

The [workshop “Big Data and Systems Analysis”](#) was successfully held in February 2020 at the IIASA facilities in Luxenberg, Austria and brought participants from USA, Canada, Austria, Russia, Netherlands, and France. Other activities in 2020 will include publication of a volume in the Springer Lecture Notes in Computer Science / Lecture Notes in Artificial Intelligence (LNCS/LNAI) series and preparation of a white paper which will summarize Task Group findings with respect to data discovery, access, and interoperability to support applied systems analysis. The [IIASA Regional Conference “Systems Analysis in Eurasia” will be held in Moscow in April 2021 \(postponed from Sep 2020\)](#) with an active participation from TG members and CODATA more widely.

As a result of opportunities for future collaboration identified at the Workshop, a CODATA-IIASA Collaboration Working Group was formed to build a stronger partnership between the 2 organizations. The Working Group will both advise IIASA on best practices for organizational data management and identify opportunities for IIASA involvement in the Decadal Programme. IIASA has joined CODATA as a partner organization and an MOU is in preparation.

Agriculture Data, Knowledge for Learning and Innovation TG

Liaisons, Jianhui LI, Joseph Muliaro Wafula



Partners include CODATA, KALRO, JKUAT and the World Bank. Website:

<http://www.codataatg.or.ke/>

The primary objectives are:

1. Development of innovative solutions to improve access to agricultural research data
2. Build capacity of data owners on data science for the benefit of the public
3. Collect available data sets and publish on online open access platforms

In 2019, the TG, provided expert input and consultation on the development of the KALRO big data and analytics platform. They ran training sessions in data science and data stewardship, with participants across East Africa. And they organised a successful session at CODATA 2019 Beijing:

https://conference.codata.org/CODATA_2019/sessions/143/

In 2020-2021, the TG will continue the series of training activities for scientists, stakeholders and policy makers on open data policy, data management and analytics technologies for open data, need for data preservation, and the merits of open data and open science. There will be further development and dissemination on the KALRO big data and analytics platform (including webinars). The intention is also to organise session(s) at the International Open Data Conference in Nairobi, but this has been postponed from November 2020.

Smart Cities TG

Liaison, Bonnie Carroll

For the first year, much of the TG work was done through individual TG members. The work included organizing five sessions on social inequality and justice; complexity and scaling; big data and IoT; cognition; and migration at an international conference where the CODATA association was clearly displayed. The TG sponsored student and open workshops including [International Workshop, Venice Architecture Biennale](#) (<https://en-urban.tau.ac.il/events/Biennale2018>); Secure data sharing at the Digital Society Institute: How to Fix the Internet

<https://www.utwente.nl/en/digital-society/events/2019/12/63530/solid-winter-meetup-enschede-how-to-fix-the-internet>; Blockchain in the Municipal Ecosystem

https://en-urban.tau.ac.il/events/Forum_2018-10-10; Transportation and periphery

https://urban.tau.ac.il/events/Forum_2018-06-17. Three courses were given to international students on Smart Cities. Three course on Ethics in Smart Cities were given for students at Tel Aviv University. The TG Chair gave lectures for international delegations including Canada, Hungary, Taipei, CODATA on smart city topics. Finally, two publication were produced giving credit to CODATA and the TG.

As the TG continues in the second year, it intends to define the data components members share in our research; and a problem or a cluster of problems that are encountered by many cities. The goal will be to identify the focus of the data interoperability work for the Decadal Program. With the one year extension we will focus on the Decadal Program: Data for Resilient and Healthy Cities. To that



end, a document was prepared that pulls together the results of a series of initial conversations with subgroups of the initial Decadal Program Working Group on (Data For) Resilient and Healthy Cities. The objective of the conversations was to identify a (data) problem or a cluster of problems that are encountered by many cities and therefore, could be the focus of the data interoperability work for the CODATA WG and its partners. Some common themes have been highlighted and the TG will work with the other partners to lay out this area for the Decadal Program.

Finally, facing the Covid-19 crisis we also wish to expand the TG and invite researchers engaged in urban dynamics, urban-tech, data science and other areas that combine information (data, algorithms) and behavior with societal and environmental aspects.

Citizen Science TG

Liaisons, Daisy Selematsela, Tyng-Ruey Chuang

The Task Group (TG) on Citizen Science for the SDGs – Aligning Citizen Science outcomes to the United Nations Sustainable Development Goals spent much of 2019 on two tasks: (a) finalizing and submitting the journal article from the first iteration of the TG on citizen science data management, and (b) determining the scope of its activities given the existence of recently initiated activities by a number of groups in this space. The scope of work is now final and is included in the Appendix.

Under the first activity (Objective 1), members of the TG who were involved in the prior group and the current group (de Sherbinin, Cooper, Faustman, Haklay) worked on finalizing the journal article and submitting it to the journal *Citizen Science: Theory and Practice*. The paper has been accepted for publication with minor revisions. The first objective will be to disseminate findings from the paper to the wider citizen science (CS) community through the respective CS associations, well designed summary fact sheets, and other mechanisms (e.g. a WDS Blog is planned). De Sherbinin and Bowser (lead author) are also planning to contribute a commentary article on behalf of the CODATA-WDS Task Group to a special issue they are editing of *Frontiers in Environmental Science on Citizen Science Methods and Data*. This will be in a sense an “institutional” commentary, and will engage the CODATA and WDS liaisons on the Task Group.

For the second activity (Objective 2), TG co-chair Rosy Mondardini developed a spreadsheet that lists the initiatives that have begun over the last few years working in the space of CS data development and management for the SDGs. This helped to ensure that TG activities would not overlap with other initiatives, and guided the development of objectives 2 and 3 of the Scope of Work. The work on developing objectives 2 and 3 still took some time, as TG members explored different options, including supporting a citizen science initiative led by FreshWater Watch in Ethiopia as a test case in government use of SDG data. The ability of the TG to work with the Ethiopia project was determined to be beyond reach largely because the amount of funding required to do the work goes beyond what the TG is able to provide.

The TG has hired interns for work on Objectives 2 and 3 and work is ongoing. An intern (Kishore Sivakumar from the Center for Research and Interdisciplinarity) has been hired to work on Objective



2 and is supervised by Rosy Mondardini at ETH in Zurich. A second intern (Adenike Shonowe, University of Nigeria) is being hosted by Peter Elias at the University of Lagos. This intern is working on Objective 3, and the TG worked with her extensively to refine the survey design. Work is progressing on both objectives.

Next Steps

Objective 1

- Revise paper
- Extract practices
- Produce material (possibly engage a designer)
- Outreach

Objective 2

- Work with Kishore Sivakumar
- Define the fields (target/indicator) we want to focus on
- Study each of them and produce simple “translation” in CS measurable quantities
- Produce for each, CS guidelines
- Disseminate the step-by-step guidelines

Objective 3

- Work with Adenike Shonowo
- Survey a subset of African CS projects that are explicitly addressing SDG targets and indicators related to SDGs 9 and 11 (or have very strong linkages to them)
- Analyze results in a white paper
- Disseminate results (journal article, blog posts, etc.)