



IUGG



**International Association
of Geodesy**

Newsletter

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The *IAG Newsletter* is under the editorial responsibility of the *Communication and Outreach Branch* (COB) of the IAG.

It is an open forum and contributors are welcome to send material (preferably in electronic form) to the IAG COB (newsletter@iag-aig.org). These contributions should complement information sent by IAG officials or by IAG symposia organizers (reports and announcements). The *IAG Newsletter* is published monthly. It is available in different formats from the IAG new internet site: <http://www.iag-aig.org>

Each *IAG Newsletter* includes several of the following topics:

- I. news from the Bureau Members
- II. general information
- III. reports of IAG symposia
- IV. reports by commissions, special commissions or study groups
- V. symposia announcements
- VI. book reviews
- VII. fast bibliography

General Announcements

International Symposium in honour of Professor Erik W. Grafarend



Photo: Tilo Reubelt

International Symposium in honour of Professor Erik W. Grafarend was organized at the University of Stuttgart in the evening of November 11, 2019. More than 25 colleagues were gathered into this intimate occasion to congratulate and celebrate the 80th anniversary of Erik Grafarend. Topics in the presentations covered many different activities of Erik Grafarend, including his long-time relations to Hungary, Sweden and Finland, IAG, Alexander von Humboldt foundation, and more general topics related on his research and publications. Excellent “Jazz Combo Stufe 7” orchestra entertained the audience during the intermission.

Congratulations to Erik Grafarend also on behalf of IAG.

Markku Poutanen
IAG Secretary General

Erik Grafarend is now 80 years old; a life dedicated to science, teaching and research rooted in Geodesy, but with branches in many different fields. After the heroic era of Geodesy in the second half of the last century, dominated by scientists like Baarda, Bjerhammar, Moritz, Kaula, Krarup, Marussi and others, the figure of Grafarend stands out as an epigone of the past and a pillar of the future with the support of the powerful arm of Alexander von Humboldt foundation, he has educated and spread around the world dozens of important researchers, till very recent days. With them, his school, he has investigated in depth practically all areas of our science, bringing in it his personal views, often originated in physical and mathematical background. It is impossible of course to analyze his results in a few pages, yet it is instructive to list the many compartments where his thought has impressed a visible track.

Relativistic Geodesy: exploring the applications of Special and General Relativity approach to geodetic problems as the definition of a relativistic Reference-System, the relativistic description of Earth rotation, relativistic effects in satellite orbits determination etc.

Statistical Geodesy: optimal estimation/prediction theory with particular care of the rank deficiency problem, linear and non-linear models. Total Least Squares, variance-covariance estimation, prediction with random effects models, optimal regularization etc.

Geodetic Networks: networks in 3D and 4D, definition of the geodetic datum, free networks, second and third order design optimization, deformation analysis, strain matrices and their statistical analysis etc.

Geophysical Geodesy: dynamics of the rotating planet, continuum dynamics and deformation, Love-Shida numbers, tidal theories etc.

Satellite Geodesy and Navigation: orbit determination, 3D and 4D networks including satellites and their dynamics, rank deficiency in networks with spatial observations (Doppler, GPS) , observables of INS-GPS systems, gravity from space (the invariants approach) etc.

Geometric Geodesy and Mapping: differential forms in Geodesy, coordinate transformations, Cartan frames and calculus, the holonomy problem with geodetic coordinates, rays geometry in a refractive medium, map projections and their transformations, optimal map projections, etc.

The Geodetic Boundary Value Problem: various formulations of the GBVP (Stokes, Molodensky, overdetermined, time -varying, a GBVP between two boundaries, etc.)

Geoid and Height Datum: geoid and telluroid definition, the Stokes problem for the Ellipsoid, analysis with ellipsoidal harmonics, W_0 estimation, etc.

Indeed geodesy at 360°! And note that just a few months ago I had the pleasure to read a long report on Anholonomy in Pre and Relativistic Geodesy! Two trademarks of Erik's work, joined in one paper.

So, not only we have to acknowledge the gigantic work done by Erik Grafarend but we have to recognize too that he continues to contribute to our science, so we are looking forwards for his new achievements in the future.

Fernando Sansò

Meeting Announcements

Meetings Calendar

IAG Sponsored Meetings

11th IVS General Meeting

March 22 –28, 2020, Annapolis, MD, USA

URL: <https://ivs2020.com/>

19th International Symposium on Geodynamics and Earth Tides (G-ET Symposium 2020)

June 7 –11, 2020, Wuhan, China

URL: <http://get2020.csp.escience.cn/dct/page/1>

IGS Workshop "IGS 2020: Science from Earth to Space"

August 10 –14, 2020, Boulder, CO, USA

URL: <https://www.igscb.org/event/>

43rd COSPAR Scientific Assembly

August 15 –23, 2020, Sydney, Australia

URL: <http://www.cospar2020.org/>

2nd International Symposium of Commission 4: Positioning and Applications

September 7 –11, 2020, Potsdam, Germany

URL: <https://www.iag-aig.org/events/17>

22nd meeting of the Consultative Committee for Time and Frequency (CCTF)

October 26 –30, 2020, Sèvres, France

URL: <https://www.iers.org/ IERS/EN/NewsMeetings/ForthcomingMeetings/forthcoming.html>

IAG Scientific Assembly

June 28 – July 3, 2021, Beijing, China

URL: <http://www.iugg.org/meetings/assemblies.php>

IAG Related Meetings

3rd UN GGIM Subcommittee on Geodesy Plenary Meeting

April 20-22, 2020, Windsor, United Kingdom

URL: http://ggim.un.org/meetings/2020/6th_HLF

6th High Level Forum on UN GGIM

April 20-22, 2020, Windsor, United Kingdom

URL: http://ggim.un.org/meetings/2020/6th_HLF

EGU General Assembly 2020

May 3-8, 2020, Vienna, Austria

URL: <https://egu2020.eu/>

FIG Working Week 2020

May 10-14, 2020, Amsterdam, the Netherlands

URL: <http://www.fig.net/fig2020/>

AOGS2020 17th Annual Meeting

June 28 – July 4, 2020, Gangwon, South Korea

URL: <http://www.asiaoceania.org/aogs2020/public.asp?page=home.html>

Reports

ILRS Technical Workshop 2019

Stuttgart, Germany, October 20-25, 2019

This year's International Laser Ranging Service (ILRS) Technical Workshop was hosted by German Aerospace Center (DLR) in Stuttgart, Germany, from October 21st to 25th. Following the motto "Laser ranging: To improve economy, performance, and adoption for new applications" the presentations were focused on the technical challenges for the satellite laser ranging (SLR) ground segment.

During the introductory session, invited speakers presented their view of the current state of the ILRS station network and its possible evolution in the next years. Subsequent sessions focused on the improvement of current systems, synergies with other technologies (such as laser communications or time transfer) and new technical approaches for future ranging systems. The final session was focused on safety and security, especially laser safety in respect to aircrafts passing over the stations.

To encourage discussion and exchange among the participants, some sessions included dedicated time slots for plenary or panel discussions. These were very well received and saw a lot of contributions from many different participants. To highlight the importance of poster presentations, a separate time slot has been reserved for poster viewing, and the three best posters have been awarded a prize. The week was rounded off by a bus tour to the two SLR stations in Stuttgart and a conference dinner.

The workshop was preceded by a one-day SLR school on October 20th, which provided a range of entry level talks for students and people new to SLR. This first edition of such a school for SLR related topics was met with overwhelming interest and was seen as a good way to pass on first-hand knowledge to a younger generation. The lectures have been videotaped and will be made available on the workshop website.

With its 150 participants from more than twenty countries and more than seventy presentations (oral and poster), the workshop mirrored the importance of the global laser ranging network and its many active developments. More information, including abstracts and presentations, can be found on the workshop website:

https://cddis.nasa.gov/2019_Technical_Workshop/



Photo of participants

Daniel Hampf

*German Aerospace Center (DLR), Institute of Technical Physics, Stuttgart, Germany
Chair of local organising committee*