



Still making invidious comparisons

In view of the Society's recent efforts to increase the participation and recognition of women in our field, I was disheartened to read, in the opening sentence of the memorial tribute to Jane Cronin Smiley Scanlon in the October *Notices*, the description of her as "one of the most prominent female mathematicians of the twentieth century," followed later on by the section heading "Celebrating an Outstanding Woman Mathematician" and, in the final sentence of the tribute, the phrase "a star in the constellation of female mathematicians." It is clear from her name that Professor Scanlon was a woman, and the description in the tribute of her accomplishments leaves no doubt about her stature within the field. The qualifying adjectives "woman" and "female" in the passages just cited thus serve no purpose other than to diminish her achievements in comparison with those of her male contemporaries. Perhaps that was not intended by the author, but the editors should have caught those invidious distinctions and removed them before publication, since the dead cannot defend themselves from such posthumous slights.

—John W. Dawson, Jr.
Professor Emeritus of Mathematics
Penn State York

(Received November 11, 2019)

Response from Erica Flapan

Dear Professor Dawson,

Thank you for bringing this to my attention. The memorial tribute for Professor Scanlon was meant as a celebration of her life and work during a period when women mathematicians often faced discrimination or marginalization. The *Notices* did not intend to diminish her accomplishments or in any way imply that expectations of female mathematicians are lower than those of male mathematicians. We apologize to readers who may have been offended by the article's references to Professor Scanlon's gender.

—Erica Flapan
Editor in Chief

*We invite readers to submit letters to the editor at notices-letters@ams.org.

Response from Edward F. Aboufadel

Prof. Dawson is correct to note that STEM professional organizations, including the Society, have embarked on intentional efforts "to increase the participation and recognition of women." For that reason, in writing the tribute to my thesis advisor, I was deliberate in emphasizing her gender. Recent research [M] shows that one reason that young women lose interest in STEM fields is due to an insufficient number of female role models. Prof. Scanlon can serve as a historic role model, having persisted in a time when women in STEM faced "barriers to advanced training, bias against women in hiring and promotion practices, and a lack of recognition of women's accomplishments" [Q]. Yes, Scanlon was one of the great mathematicians of the 20th century. Rather than diminishing her accomplishments, it is fair to say that adding the adjectives "woman" and "female" elevates them.

—Edward F. Aboufadel
Associate Vice President & Professor of Mathematics
Grand Valley State University

References

- [M] S. CHONEY, *Why do girls lose interest in STEM? New research has some answers—and what we can do about it*, 13 March 2018. Available at <https://news.microsoft.com/features/why-do-girls-lose-interest-in-stem-new-research-has-some-answers-and-what-we-can-do-about-it/>. Accessed 18 November 2019.
- [Q] K. S. QUERTERMOUS, *Women in Mathematics book review*, *Notices of the American Mathematical Society*, 66 (3), 395–398, 2019. Available at <https://www.ams.org/journals/notices/201903/rnoti-p395.pdf>. Accessed 18 November 2019.

Letter to the Editor, *Notices of the American Mathematical Society*

Dear Editor,

I greatly enjoyed the excellent article "Maps with Least Distortion Between Surfaces: From Geography to Brain Warping" by Athanase Papadopoulos. However, it is a sad fact that math, esp. math with applications, is becoming more and more fragmented. Thus Professor Papadopoulos's article deals with the study of warpings (i.e. diffeomorphisms) between shapes that minimize some supremum of some point-wise measure of distortion. A quite different approach to the same problem is based on putting a right-invariant Riemannian metric on the (infinite-dimensional) group of diffeomorphisms subject to various

degrees of smoothness. This defines geodesics on the group and one can ask for geodesics of shortest length connecting the identity to a map warping of the first surface to the second. Equivalently, the space of surfaces is a coset space of the group of diffeomorphisms of \mathbb{R}^3 and one considers geodesics with respect to the quotient metric. This approach has been the object of a large body of research involving mathematicians, computer scientists, statisticians, and engineers, including myself. Applied to the study of the human body, it has also connected with medical researchers under the acronym LDDMM (Large Deformation Diffeomorphic Metric Mapping; see *Wikipedia* article with this title). The purpose of this letter is to give readers some references to this research as a supplement to the target article.

Our group started from inspiring ideas due to Ulf Grenander in the US and to Robert Azencott in Paris. Grenander wrote to some of us twenty years ago saying “Hold onto your seat-belts” and proposed a major computational study of the whole human body and all its components with templates for their mean shape (male and female) and statistical models (unlikely to be normal) for all healthy and diseased variations. While this is still a dream, major progress, especially on the brain and its hippocampus, has been made by Michael Miller and his team (see Miller, Alain Trounev, and Laurent Younes, *Hamiltonian Systems and Optimal Control in Computational Anatomy: 100 Years Since D’Arcy Thompson*, *Annual Review of Biomedical Engineering*, 2015 and multiple papers in the journal *Neuroimage*, e.g. The diffeomorphometry of temporal lobe structures in preclinical Alzheimer’s disease, by Miller, Laurent Younes, and their team at Johns Hopkins). Proper mathematical foundations were provided by Peter Michor, using his concept of “Convenient Calculus” for infinite dimensional manifolds (*The Convenient Setting of Global Analysis*, Michor and Andreas Kriegl, AMS, 1997).

Surveys of the approach are in (a) the book *Shapes and Diffeomorphisms* by Laurent Younes, Springer, 2010, (b) Overview of the Geometries of Shape Spaces and Diffeomorphism Groups, by Bauer, Bruveris and Michor, *Journal of Mathematical Imaging and Vision*, 2014 and (c) the report Manifolds of mappings and shapes, by Michor, arXiv:1505.02359, 2015. In many respects, Sobolev metrics on the group of diffeomorphisms are the key players. These arise from the right-invariant extension of a metric on vector fields v (the Lie algebra of the group of diffeomorphisms) given by $\int (v(x)Lv(x))dx$ where L is a positive definite self-adjoint operator. Geodesic distance collapses if too few derivatives are used but these are fine complete metrics when it is large enough. After Darryl Holm joined our group, we learned the importance of using the momentum of geodesics (see e.g. The Geometry of Image Registration: The Diffeomorphism Group and Momentum Maps, Bruveris and Holm, in the Springer book, *The Legacy of Jerry Marsden*). If A is the Green’s function of L , then the cotangent space for this metric is naturally identified with

co-vectors ω such that $\int (\omega(x), A\omega(x))dx$ is finite. For Sobolev metrics of high enough degree, ω can have finite support, giving us soliton-like solutions to the geodesic equation.

Following Prof. Papadopoulos’s lead, it is hard for me to resist mentioning that we can warp maps too. I made a study of a 12th century Chinese map known as the “Yu Ji Tu” (map of the trails of the legendary emperor Yu). This can be warped onto modern latitude and longitude using a geodesic whose momentum is concentrated at a small set of landmark points on the map whose modern locations are clear. The result shows how stubbornly the Chinese clung to a flat model of the earth, sacrificing fidelity to their compasses and the North Star but ensuring that the Cartesian scoring on the original stone was very nearly equidistant (Georeferencing the Chinese Yujitu, Alexander Akin and myself, *Cartography and Geographic Information Science*, 2012, or www.dam.brown.edu/people/mumford/beyond/papers/2012d--Yujitu-journal.pdf).

—David Mumford
Professor Emeritus of Applied Mathematics
Brown University

(Received November 19, 2019)

Security at ICM 2022

The 2022 International Congress of Mathematicians (ICM) will meet July 6–14 in St. Petersburg, Russia. Have the ICM 2022 Organizing Committee and the AMS obtained, or attempted to obtain, assurances from the Russian government that Americans at the ICM will not be harassed? The Russians have forced the closure of the American Consulate in Saint Petersburg, so consular services are not easily available.

Attention was brought to this issue by the article “Kremlin delayed departure of plane evacuating an ailing US attaché” published in the *New York Times* on November 3, 2019, page A8. Quoting a former CIA station chief in Moscow, the *Times* reported that “Russia’s internal security service...wants foreign officials and their families to feel like they’re on enemy soil inside Russia. They want officials and their families to be under duress....”

Security issues were not discussed in Andrei Okounkov’s article, “Plans for ICM 2022,” in the *Notices* in February 2019.

—Melvyn Nathanson
Lehman College (CUNY)

(Received November 3, 2019)

Response from Andrei Okounkov

Dear Professor Nathanson, Dear American Colleagues,

While traveling over 4000 miles away from home is never worry-free, one thing you shouldn’t worry too much about is your personal safety in Russia. Hospitality is a very

important part of the Russian culture and you can count on a warm welcome from your Russian colleagues and ordinary Russians alike. By any measure, St. Petersburg is at least several times safer than the Bronx, where Lehman College makes its home (e.g. per capita 2019 year-to-date robbery numbers for St. Petersburg are 7.62 times lower than for the Bronx).

While some people may be afraid to be singled out from our universal welcome, numbers show that xenophobia is not a significant factor in today's Russia. For instance, the report <https://www.sova-center.ru/en/xenophobia/reports-analyses/2019/02/d40603/> by the SOVA human-rights watchdog shows that the number of hate-motivated crimes in Russia has fallen more than 10-fold over the last decade. Nearly a million people came to the 2018 World Cup in Russia, and not a single instance of unwelcoming behavior has been reported. Please come and see for yourselves, you will have a great time in St. Petersburg!

The *Notices of AMS* is hardly the place to discuss the clear anti-Russian bias of the *New York Times*, but we will post a more detailed analysis regarding any actual or perceived safety threats on the ICM website icm2022.org, including tips on what to avoid in a big city like St. Petersburg.

In closing, I would like to personally invite Prof. Nathanson to the St. Petersburg ICM. You came to Russia during the Cold War, and I believe you had a very productive stay in Moscow. Please come visit again and see the dramatic improvement in our congress, tourism, transportation, and public safety infrastructure. It would be great to have you there!

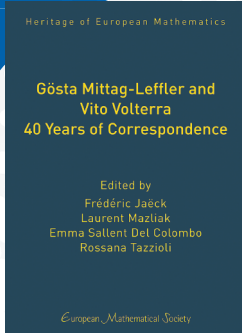
—Andrei Okounkov,
on behalf of the ICM 2022 LOC

Response from Catherine Roberts

The AMS has policies encouraging welcoming, inclusive, and safe environments for all mathematicians, and we will do our part to help increase the level of comfort for all the attendees of ICM 2022. The AMS will be starting a new program for our own meetings in 2021 to provide trained and easily identified on-site staff and volunteers who can effectively address issues related to our welcoming environment policies. The AMS will work in partnership with the ICM 2022 Local Organizing Committee to offer such a program in St. Petersburg.

—Catherine Roberts
Executive Director of the AMS

FEATURED TITLES FROM THE
**EUROPEAN
MATHEMATICAL
SOCIETY**



Gösta Mittag-Leffler
and Vito Volterra
40 Years of
Correspondence

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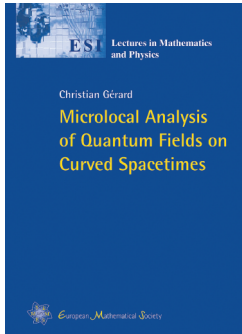
European Mathematical Society

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Volterra and Mittag-Leffler's exchanges illustrate how general analysis, especially functional analysis, gained a dramatic momentum during those years, and how Volterra became one of the major leaders of the field, opening the path for several fundamental developments over the following decades.

Heritage of European Mathematics, Volume 12; 2019; 438 pages; Hardcover; ISBN: 978-3-03719-199-6; List US\$98; AMS members US\$78.40; Order code EMSHEM/12



Microlocal Analysis
of Quantum
Fields on Curved
Spacetimes

Christian Gérard

ESI Lectures in Mathematics and Physics

European Mathematical Society

Microlocal Analysis
of Quantum
Fields on Curved
Spacetimes


Christian Gérard, *Université de Paris 11, Orsay, France*

This monograph focuses on free fields and the corresponding quasi-free states, and, more precisely, on Klein Gordon fields and Dirac fields. It will be useful to both mathematicians and mathematical physicists.

ESI Lectures in Mathematics and Physics, Volume 10; 2019; 228 pages; Softcover; ISBN: 978-3-03719-094-4; List US\$58; Individual member US\$46.40; Order code EMSESILEC/10

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