

Empowering Novel Geometric Algebra for Graphics & Engineering Workshop @ CGI 2024 – 1st July 2024

1st Call for Papers

<http://www.cgs-network.org/cgi24>

The ACM Siggraph 2001, 2003, 2019 and 2022 saw Geometric Algebra (GA) featured in the form of a Keynote and Courses. The GA community continues to highlight the benefits of employing W. K. Clifford's GA, quaternions and octonions for computer graphics and vision problems. The advances were presented at the Workshops CGI'2016 on "Geometric Algebra in Computer Science and Engineering" and every year at CGI'2017-2023 on "Empowering Novel Geometric Algebra for Graphics & Engineering (ENGAGE)" and have underlined the power of GA for analysis and computation. GAME2020, 2023, further boost GA and associated algebras as a language for Graphics.

Under the auspices of CGI'24 (1-5 July 2024), ENGAGE2024 on **July 1st** in Geneva, Switzerland, with **keynotes by Johannes Brandstetter, George Papagiannakis and Yu Zhaoyuan**, will again provide a multi-disciplinary approach from mathematics applied to computer graphics, computer vision and general computer science fields, where GA has strong potential to answer existing mathematical problems.

Geometric algebra is particularly well suited to allow cross-disciplinary solutions in software engineering as it provides an intuitive and insightful common denominator across mathematical disciplines used in a variety of applications. Understanding GA enables us to relate distinct, seemingly incompatible paths by providing a common geometric and mathematical base.

We invite original contributors in the form of papers, which advance the state-of-the-art in both the application of geometric algebra and its instantiation in software and hardware.

Topics will include, but are not limited to:

- Feature detection & Data analysis
- LIDAR and point cloud algorithms
- Scientific & Information visualization
- Computer graphics rendering
- Computer animation and video processing
- Holographic optics & Holographic maps
- Geographic information systems GIS & Climate
- Soundscape & Electromagnetic landscape modelling
- AR, VR, XR
- Clifford integral transforms for 2/3D images/color images
- Higher dimensional geometric algebras, octonions
- GA computing, HPC and quantum computing
- GA hardware implementations
- GA for AI & deep learning, multi-modal data mining/data fusion
- GA for ubiquitous information processing
- GA for big data processing & visualization
- Other engineering/science applications using GA

Authors should submit *papers* directly to the CGI conference LNCS proceedings, by May 2, 2024. All authors of accepted ENGAGE related papers will be invited either to an oral or poster presentation. For Springer LNCS CGI proceedings author instructions please refer to <http://www.cgs-network.org/cgi24/#callforpapers>.

Post workshop *extended* and more *advanced* ENGAGE *papers* can be published in a special issue of the journal Adv. in Appl. Cliff. Algs., and should have been orally presented at

the conference. Author guidelines: <https://www.springer.com/journal/6/su-bmission-guidelines>. Online

submission, with deadline of Dec. 31, 2024:

<https://www.editorialmanager.com/aac-a/default2.aspx>. At the time of submission, authors must indicate the Topical Collection "TC ENGAGE 2024".

IMPORTANT DATES

All participants:

Abstract submission (~200 words): Apr. 15, 2024 to hitzer@icu.ac.jp, dietmar.hildenbrand@gmail.com

ENGAGE Papers: (to appear in Springer LNCS proceedings, 8-12 pages)

- Paper submission: May 2, 2024
- Paper notification: June 5, 2024
- Camera ready papers: June 20, 2024

Full Journal AACA Papers: (Latex using `birkjour.cls`)

- Paper submission: *Aug. 01, 2024 - Dec. 31, 2024*

For **further information**, please contact the organizers:

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- ([#] = local workshop organizers)