

Charles G. Gunn, Ph. D.

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WORK EXPERIENCE

Seminar and Consulting Activity, Raum+Gegenraum, Falkensee, Germany 11.2014-present
Lecturing and writing devoted to projective geometric themes (see details below).

Mathematics, Visualization and Education Specialist TU Berlin 10.2003 - 09.2009, 10.2010-10.2014
Research and development in projective geometry, Ph. D. thesis focused on its role in kinematics and mechanics, also in non-euclidean spaces (see publications below). [Open source software development](#). [Teaching of courses in math visualization](#). [Work on educational mathematical movies](#). [Production of 3D mathematical prints](#).

Math Teacher, Green Meadow Waldorf High School, Chestnut Ridge, NY, USA 09.1998 - 06.2003
Teaching of math main lessons and skills classes in grades 9-12. Work to modernize the skills classes curriculum. Development of 10 different main lessons and diverse teaching resources.

Visiting Researcher, Technical University Berlin 03.1993 - 06.1997
Research in mathematical visualization, development of visualization software.

Technical director, Geometry Center, University of Minnesota, USA 09.1987 - 03.1993
Collaboration with mathematicians to create visualization projects including software applications and animations. Director of award-winning mathematical animation **Not Knot**.

Research and Development, Pixar, San Rafael, CA, USA 04.1985 - 08.1987
Worked on development of rendering software for a microcoded graphics computer Pixar Image Computer.

Research and Development, Tektronix, Beaverton, OR, USA 03.1984 - 01.1985
I developed a microcode simulation of hardware for CSG quadric surface solid modeler.

EDUCATION

Technische Universität Berlin, Ph. D., Mathematics, September 2011

Seminar für Waldorfpädagogik, Mannheim, Waldorf High School Teaching Training Certificate, April 1997

University of North Carolina at Chapel Hill, M. S., Mathematics, December 1983

University of North Carolina at Chapel Hill, B. A., Mathematics, May, 1978

SELECTED PUBLICATIONS

“[Doing euclidean plane geometry using projective geometric algebra](#)”, *Advances in Applied Clifford Algebras*, 27(2), 1203-1232, arxiv.org/abs/1501.06511.

“[Geometric algebras for euclidean geometry](#)”, (plenary lecture at [ICCA10](#), Tartu, August, 2014), *Advances in Applied Clifford Algebras*, 27(1), 185-208, arxiv.org/abs/1411.6502.

“[Raum und Gegenraum](#)”, *Mensch+Architektur*, pp. 24-28, Issue 83/84, 9/2014, Berlin.

"[Rendering the Whole World Using Conformal Curvilinear Perspective](#)", Proceedings of the Bridges International Conference, Enschede, Holland, July 27-31, 2013, pp. 425-428. ([Extended Version for CD Proceedings](#))

"[Geometry, Kinematics, and Rigid Body Mechanics in Cayley-Klein Geometries](#)", Ph. D. Thesis, Mathematics, Technische Universität Berlin, September 2011, 170 pp.

"[Ribbon Edges: A New Impulse for Geometric Sculpture](#)", Proceedings of Bridges Conference 2010, July 24-28, Pecs, Hungary, pp. 403-406

"[The Borromean Rings: A Video about the new IMU Logo](#)", with John Sullivan, Proceedings of Bridges Conference 2008, Leeuwarden, Netherlands, pp. 63-71

"A Computer Implementation of the Two Dimensional Crystallographic Groups", Master's Thesis, UNC-CH Mathematics Department, December 1983.

SELECTED SEMINARS AND TALKS

"[Gegenraum: Auch für Physiker?](#)", Physiker Arbeitstagen, Naturwissenschaftliche Sektion, Dornach, Switzerland, Feb. 28, 2018.

"Die Iscador Mischmaschine zwischen Raum und Gegenraum", lecture, Hiscia Institut, Arlesheim, Swizkerland, Feb. 1, 2018.

"[Wo denn sonst? Auf der Spur eines erweiterten Raumbegriffs](#)", seminar offered at 18th Kasseler Jugendsymposium, Kassel, Germany, Dec. 14-17, 2017.

"[The Plant between Space and Counterspace](#)", weekend seminar using projective geometry to study morphology of plants, Schwija-Semlja Biodynamic Farm, Potutory, Ukraine, Oct. 6-8, 2017.

"Are the paths of the planets circular?", lecture presented at Projective Geometry Seminar, Wynstones School, Gloucester, UK, Feb. 13-15, 2017.

"[The Geometry of Life](#)", weekend seminar introducing space and counterspace, Schwija-Semlja Biodynamic Farm, Potutory, Ukraine, Sept. 16-18, 2016

"Short course in Projective Geometry", at the Internationales Mathecamp am Werbellinsee, August 24-26, 2016 (for winning teams of the 2016 Kanguru Math Competition. (Same in August, 2015).

"An Introduction to Counterspace", two lectures presented at Projective Geometry Seminar, Field Center, Nailsworth, Engliand, Feb. 16-18, 2016.

"Euclidean Geometry Using Geometric Algebra" and "Using Visualization to Help Mathematics Teaching", two lectures presented at University of Mainz Mathematics Department, Jan. 7-8, 2016.

"Free Geometry of Plane Curves", and "Schnellkurs Gegenraum [Counterspace 101]", International Refresher Course Week, Lehrerseminar für Waldorfpädagogik, Kassel, Germany, March 27-April 2, 2015.

Introductory lectures on projective geometry, Urania public lectures and Lange Nacht der Wissenschaft, TU Berlin , various times 2012-2016.

"[GA²: George Adams und Geometrische Algebra](#)", Seminar, Mathematical-Astronomical Section, Dornach, Switzerland, June 27-29, 2014.

ART & ANIMATION

"[10-cell Views](#)", 3 minute computed generated animation about a tiling of the 3D sphere with truncated tetrahedra. Included in Math Movie Film Show of Bridges Conference 2016.

[“12 x 22x”](#) and [“View Inside the 10-cell”](#), computer images, in Art Show of Bridges Conference 2016.

[“conform!”](#), artistic and technical director, 15 minute computed generated animation about the history of conformal maps, TU-Berlin, 2015, Named Best Experimental Film, Berlin Short Film Festival 2015.

[“Ames room installation”](#), with Thomas Neukirchner, Waldorf School Karlsruhe, January 2012.

[“A New Logo for the IMU”](#), technical direction, 6 minute animation featuring the new logo of the International Mathematical Union, TU-Berlin, 2006

“Not Knot”, technical director, 15-minute animation on a topic in 3-dimensional topology. Jones and Bartlett, Boston, 1991. Award of Distinction, Prix Ars Electronica, Linz 1992.

PERSONAL

I am married to Edeltraud; we have a daughter, Lucia (14). We live in Falkensee outside Berlin.