Konstantinos GAVRIIL

Contact

website: konstantg.me
e-mail: konstantinos.gavriil@sintef.no

Education

PhD in Technical Mathematics September 2020
Institute of Discrete Mathematics and Geometry, TU Wien, Austria.

Thesis title: *Interactive Freeform Architectural Design with Nearly Developables and Cold Bent Glass*
Supervisor: Helmut Pottmann

MSc in Computational Science September 2016
Department of Informatics & Telecommunications, National & Kapodistrian University of Athens.

Thesis title: *Implicitization, Interpolation and Syzygies*
Supervisor: Ioannis Emiris

BSc in Mathematics July 2014
Department of Mathematics, National & Kapodistrian University of Athens.

Work Experience

SINTEF Digital Research Scientist
Oslo, Norway February 2021 - now
Research Scientist at the Geometry group of the Mathematics and Cybernetics department of SINTEF Digital.

TU Wien Project Assistant
Vienna, Austria September 2019 - November 2020
Research assistant at the Applied Geometry group of the Institute of Discrete Mathematics and Geometry at TU Wien.

The last year of the PhD research was carried out at TU Wien and involved finalizing items [1, 2] of Publications.

Evolute GmbH ITN Marie Skłodowska-Curie Research Fellow
Vienna, Austria September 2016 - August 2019
Three-year ITN Research Fellowship under the ARCADES project, Marie Skłodowska-Curie grant agreement No 675789.

The focus of this project was doctoral research in an industrial environment. Items [1, 4] from Publications were implemented as an extension of the *EvoluteTools* Rhino plugin. The extension mainly included incorporating machine learning functionality for the prediction of material behavior at the early design stage, and geometry optimization of surfaces for developability. (see [1, 4] for details)

SINTEF Digital Invited PhD Student
Oslo, Norway September - October 2018
Invited PhD Student of the Mathematics and Cybernetics department of SINTEF Digital under the guidance of Tor Dokken and Georg Muntingh.

The focus of this two-month secondment was the adaptation of a Wasserstein generative adversarial network used in image inpainting to the problem of filling missing data in remote sensing applications, and in particular voids in digital elevation models. This project lead to the completion of item [3] in Publications.

Inria Sophia Antipolis - Méditerranée Invited PhD Student
Sophia Antipolis, France March - May 2018
Invited PhD Student of the AROMATH project team at Inria Sophia Antipolis - Méditerranée, under the guidance of Bernard Mourrain.

The focus of this three-month secondment was twofold. First, we studied the developability property of a surface S as an ideal generated by polynomial combinations of the coefficients of the control points of S. Secondly, we researched the formulation of the G^1-continuity constraint of neighboring spline surfaces as an optimization problem.

National & Kapodistrian University of Athens Research Assistant
Athens, Greece September 2014 - August 2016
Research assistant at the EρΓA Lab of the Department of Informatics and Telecommunications, National & Kapodistrian University of Athens, under the research program *Thales: Advanced Geometric Computing and Critical Applications*.

Teaching Experience

National & Kapodistrian University of Athens Teaching Assistant
Athens, Greece October 2014 - August 2016
Teaching assistant to the courses *Numerical Methods and Programming* offered at the Department of Chemistry [Fall 2014] and to *Algorithms and Complexity* offered at the Department of Informatics and Telecommunications [Spring 2015], National & Kapodistrian University of Athens.

Research Experience

Publications

[1] **Computational Design of Cold Bent Glass Façades.**
K. Gavriil, R. Guseinov, J. Pérez, D. Pellis, P. Henderson, F. Rist, H. Pottmann, B. Bickel.
ACM Transactions on Graphics (Proc. *SIGGRAPH Asia* 2020), **39 (6)**, 208:1-208:16, 2020.
DOI: 10.1145/3414685.3417843

[2] **Interactive Freeform Architectural Design with Nearly Developables and Cold Bent Glass.**
K. Gavriil.
PhD thesis, 2020.
DOI: 10.34726/hss.2020.82428

[3] **Void Filling of Digital Elevation Models with Deep Generative Models.**
K. Gavriil, G. Muntingh, O. J.D. Barrowclough.
IEEE Geoscience and Remote Sensing Letters, **16 (8)**, 1645-1649, 2019.
DOI: 10.1109/LGRS.2019.2902222

[4] **Optimizing B-spline surfaces for developability and paneling architectural freeform surfaces.**
K. Gavriil, A. Schiftner, H. Pottmann.
Computer-Aided Design, **111**, 29-43, 2019.
DOI: 10.1016/j.cad.2019.01.006

[5] **Interpolation of syzygies for implicit matrix representations.**
I. Emiris, K. Gavriil, and C. Konaxis.
7th International Conference on Algebraic Informatics, 2017.
Preprint: hal-01421866

[6] **Implicitization, interpolation, and syzygies.**
K. Gavriil.
MSc thesis, 2016.
URL: https://pergamos.lib.uoa.gr/uoa/dl/frontend/file/lib/default/data/1321136/theFile

Short involvement

[7] **On the Stability of Generalized Second Price Auctions with Budgets**
J. Díaz, I. Giotis, L. Kirousis, E. Markakis, M. Serna. (2013)

LATIN 2014: Theoretical Informatics.
Preprint: arXiv:1309.6474

Guided research under Professor Lefteris Kirousis. My contribution was focused on the examination and proof of existence of the notions of stability in the proposed mechanisms for GSP auctions with budgets (see acknowledgements).

[8] **AMINESS: A Platform for Environmentally Safe Shipping**
T. Giannakopoulos, I. A. Vetsikas, I. Koromila, V. Karkaletsis, S. Perantonis. (2014)
Proceedings of *PETRA '14*.
URL: http://doi.acm.org/10.1145/2674396.2674464

My partial involvement and contribution was in researching an effective similarity measure to be used in ship trajectory clustering.

Various projects

3d Voronoi diagrams of iso-oriented cuboids under the L^1 norm 2015
Research and development of a CGAL function to compute the 3d Voronoi diagram of iso-oriented cuboids (`Iso_cuboid_3` class) using Nef polyhedra (`Nef_polyhedron_3` class) under the infinity norm. Part of the *Computational Geometry* postgraduate course, Spring 2015, University of Athens.

Conformation space of protein active sites 2015
An extension of the MSc thesis of Anaxagoras Fotopoulos and Thanos Papathanasiou on active site modelling through rotamer rotation. In particular, the effect of slight movements of $\alpha-$helices on the conformation space of the active site cavities is examined. Part of the *Algorithms in Structural Bioinformatics* postgraduate course, Spring 2015, University of Athens.

Achievements

Fellowship 2016
Three-year ITN Marie Skłodowska-Curie Research Fellowship under the ARCADES project [grant agreement No 675789].

Scholarship 2016
One-year scholarship from the Department of Informatics and Telecommunications, National and Kapodistrian University of Athens.

Achievement Award 2016
Award for achieving the highest average grade [9.35/10.00] during the first year of MSc studies [2014-2015] in the *Computational Science* specialization, Department of Informatics and Telecommunications, National and Kapodistrian University of Athens.

Conferences

Talks

- **ARCADES Doctoral School II and ESR Days** Barcelona, Spain. Sep 2018.
- **Inria PhD Seminar**. Sophia-Antipolis, France, May 2018.
- **Inria AROMATH Seminar**. Sophia-Antipolis, France. May 2018.
- **SIAM Conference on Industrial and Applied Geometry**. Pittsburgh, USA. Jul 2017.
- **International Conference on Algebraic Informatics 2017**. Kalamata, Greece. Jun 2017.

Posters

- **Solid and Physical Modeling 2018**. Bilbao, Spain. Jun 2018.

- **ARCADES First Software & Industrial Workshop, and Midterm Review**. Athens, Greece. Nov 2017.

Activities

Reviewer
The Visual Computer, IEEE Geoscience and Remote Sensing Letters.

ESR representative 2016 - present
Representative of the Early Stage Researchers of the ARCADES project for the duration of the project.

Organizer September 2018
Co-organizer of the *ARCADES Doctoral School II and ESR Days*. Barcelona, Spain.

Technical Skills

Programming Languages
Most experienced with C++, Python.
Used VB, Java, Haskell, Prolog.

Tools
Rhino, Grasshopper, MS Visual Studio, TensorFlow, LaTeX, Maple, MATLAB, MS Office.

Languages

English	Proficiency of Michigan and Cambridge, TOEFL: 109/120.
Greek	Native.
Russian	Intermediate speaking, reading. Basic writing.
German	Elementary, 1 year of studies.