



# Carmela Filosa

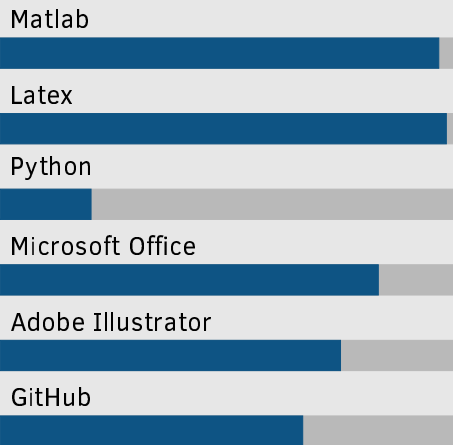
Researcher

- 28 November 1985, Torre del Greco (Italy)
- Tongelresestraat, 103 5613 DC, Eindhoven (NL)
- +31 628902617
- [www.linkedin.com/in/cfilosa/](http://www.linkedin.com/in/cfilosa/)
- [c.filosa@tue.nl](mailto:c.filosa@tue.nl)

## About me

I am a motivated and responsible person, with a strong background in both pure and applied mathematics. I am a team worker and I like to collaborate with professionals from different disciplines. In my projects I enjoy developing new skills for providing effective solutions to challenging problems. I am enthusiastic in acquiring new knowledge and willing to learn Dutch.

## Skills



## Languages

- | Language | Proficiency   |
|----------|---------------|
| Italian  | Mother tongue |
| English  | Fluent        |
| Spanish  | Intermediate  |

## Research interests

Mathematical models for industrial applications. Numerical simulations. Illumination optics. Geometrical optics. Optical design. (Quasi-) Monte Carlo Ray Tracing.

## Education

- 2014-now** Ph.D. at the Eindhoven University of Technology  
Department of Mathematics and Computer Science  
**Phase Space Ray Tracing for Illumination Optics**  
Project in collaboration with Philips Lighting  
**Keywords** Non-imaging Optics | Ray Tracing | (Quasi-) Monte Carlo simulations | Geometrical Optics | Fresnel reflection | Polarisation | Phase Space Optics | Development of Illumination Design Software.
- 2008-2013** M.Sc. Mathematics  
University of Rome *La Sapienza*  
**Keywords** Mathematical Physics | Controllability of Schrödinger's equation.
- 2004-2008** B.Sc. Mathematics  
University of Rome *La Sapienza*  
**Keywords** Ordinary Differential Equations | Perturbation Theory | Mathematical Biology | Enzymes Cynetics.

## Relevant courses

- 2014** HTO course on lighting technology (Intelligent Lighting Institute)
- 2015** Dutch for beginners (TU/e)
- 2016** IP&S patent workshop (Intelligent Lighting Institute)

## Publications

- 2017** C. Filosa, J.H.M. ten Thijs Boonkamp, and W.L. IJzerman *Inverse ray mapping in phase space for two-dimensional reflective optical systems*, Journal of Computational Physics, submitted.
- 2017** C. Filosa, J.H.M. ten Thijs Boonkamp, and W.L. IJzerman *Inverse ray mapping on phase space for two-dimensional optical systems*, proceedings OSA Conf. on freeform optics, Denver, part F50- Freeform (2017).
- 2017** C. Filosa, J.H.M. ten Thijs Boonkamp, and W.L. IJzerman *Phase space ray tracing for a two-dimensional parabolic reflector*, Mathematics and Statistics, 5(4), 135-142 (2017)
- 2016** C. Filosa, J.H.M. ten Thijs Boonkamp, and W.L. IJzerman *A fast ray tracing method in phase space*, Progress in Industrial mathematics at ECMI 2016, accepted
- 2016** C. Filosa, J.H.M. Ten Thijs Boonkamp, and W.L. IJzerman *Ray tracing method in phase space for two-dimensional optical systems*, Applied Optics 55, 3599-3606 (2016)

## Patents

- 2016** *Inverse ray mapping in phase space for two-dimensional optical systems*, submitted

## Conference contributions

- 2017** European Conference on Numerical Mathematics and Advanced Applications (ENUMATH) 2017 Voss, Norway
- 2017** Optical Design and Fabrication Congress of Optical Society of America (OSA) 2017, Denver
- 2016** European Optical Society Annual Meeting (EOSAM) 2016, Berlin, Germany
- 2016** European Conference on Mathematics for Industry (ECMI) 2016, Santiago de Compostela, Spain



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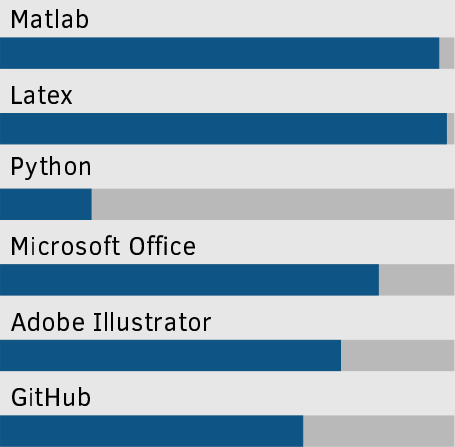
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## Other information

### Teaching activities

- 2014-2017 Tutor and instructor of mathematics and physics courses for bachelor's students at TU/e.
- 2010-2013 Teacher of mathematics in special monthly programs for high-school students at *Liceo scientifico statale "Taletè"* in Rome.

### Important activities

I participated to Dutch Mathematical Congress 2018 and ASML Ph.D. Master Class 2018.

### Communication skills

During the years of my Ph.D. I presented my research at TNO in Delft and Philips Lighting in Eindhoven. In these occasions I learned how to explain mathematics problems to people from different backgrounds. I am member of WISE (Women in Science Excel) Network since 2014.

### Description of my Ph.D. project

The purpose of this project is to develop and analyze a new ray tracing method based on the phase space representation of the optical system. This new method is faster and more accurate than existing methods. The challenge is to design this method, such that far less rays are needed than what is usual, to accurately simulate the optical system. The novel ray tracing method will be implemented in a new design tool for optical systems, enabling complicated designs of LED luminaires as well as other optical systems. The newly technique outperforms the existing mainstream optical simulation tools. This will allow to design optical components such that the desired output intensity at the target of the optical systems is achieved in a short computational time.

### Other interests

Climbing. Dancing. Aerial Silk. Hiking.

### References

Available upon request.