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## Antonios Zagaris

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The Netherlands	Website:	wwwhome.math.utwente.nl/~antoniosa

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### PERSONAL DATA

**Date of birth** February 8, 1976  
**Place of birth** Veria, Greece  
**Citizenship** Greek

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### RESEARCH INTERESTS

Singularly perturbed dynamical systems, long-term evolution of reaction–diffusion equations, dynamically invariant manifolds, pattern formation, mathematical biochemistry, dimension reduction

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### EDUCATION

**09/2001 – 05/2005** *Ph.D. (Mathematics)*, Boston U, MA, USA (Thesis Advisor: T. J. Kaper)  
**09/1999 – 05/2001** *M.Sc. (Mathematics)*, Boston U, MA, USA (GPA: 4.00/4.00)  
**09/1993 – 07/1998** *B.Sc. (Physics)*, Aristotelian U of Thessaloniki, Greece (GPA: 8.88/10.00)

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### RESEARCH EXPERIENCE

**09/2009 – now** *Assistant Professor (Universitair Docent)*, U Twente, Enschede, NL  
**09/2006 – 08/2009** *NWO Postdoctoral position*, U van Amsterdam & Centrum Wiskunde en Informatica, Amsterdam, NL  
**05/2005 – 08/2006** *Postdoctoral position*, Centrum voor Wiskunde en Informatica, Amsterdam, NL (supervised by Arjen Doelman)

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### JOURNAL ARTICLES

- H. Härdin, A. Zagaris, K. Kraab, and H. V. Westerhoff, *Simplified yet highly accurate enzyme kinetics for cases of low substrate concentrations*, FEBS J. **276** (2009) 5491–5506
  - A. Zagaris, C. W. Gear, T. J. Kaper, and I. G. Kevrekidis, *Analysis of the accuracy and convergence of equation-free projection to a slow manifold*, ESAIM: Math. Model. Numer. Anal. **43**(4) (2009) 757–784
  - A. Zagaris, A. Doelman, N. N. Pham Thi, and B. Sommeijer, *Blooming in a non-local, coupled phytoplankton–nutrient model*, SIAM J. Appl. Math. **69**(4) (2009) 1174–1204
  - A. Zagaris, H. G. Kaper, and T. J. Kaper, *Two perspectives on reduction of ordinary differential equations*, Math. Nach. **278** (2005) 1629–1642
  - C. W. Gear, T. J. Kaper, I. G. Kevrekidis, and A. Zagaris, *Projecting to a slow manifold: Singularly perturbed systems and legacy codes*, SIADS **4** (2005) 711–732
  - A. Zagaris, H. G. Kaper, and T. J. Kaper, *Fast and slow dynamics for the Computational Singular Perturbation method*, Multiscale Model. Sim. **4**(2) (2004) 613–638
  - A. Zagaris, H. G. Kaper, and T. J. Kaper, *Analysis of the Computational Singular Perturbation reduction method for chemical kinetics*, J. Nonlin. Sci. **14** (2004) 59–91
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## CONFERENCE PROCEEDINGS

- L. V. Kalachev, H. G. Kaper, T. J. Kaper, N. Popović, and A. Zagaris, *Reduction for Michaelis–Menten–Henri kinetics in the presence of diffusion*, in “Proceedings of the International Conference in Honor of Jacqueline Fleckinger, Toulouse, France 2006”, *Electr. J. Diff. Eq. Conf.* **16** (2007) 155–184
- M. J. Davis, A. Zagaris, and T. J. Kaper, *Chemical-kinetic reduction in the presence of diffusion*, Abstracts of Papers of the American Chemical Society, **228** (2004) U208

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## PREPRINTS

- A. Zagaris, C. Vandekerckhove, C. W. Gear, T. J. Kaper, and I. G. Kevrekidis, *Stability and stabilization of the constrained runs schemes for equation-free projection to a slow manifold* (submitted to *Discrete and Continuous Dynamical Systems A*)
- A. Zagaris and A. Doelman, *Emergence of steady and oscillatory localized structures in a phytoplankton–nutrient model* (submitted to *Nonlinearity*)
- H. Härdin, A. Zagaris, and H. V. Westerhoff, *Relaxation behavior in reactive protein networks as instantiated in the phosphotransferase system* (submitted to *BMC Bioinformatics*)
- J. W. A. Vaandrager, A. Zagaris, and J. L. Herder, *Synthesis method based on elastic potential for large deflection building blocks in compliant mechanisms*

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## ONGOING PROJECTS

- *Phytoplankton dynamics in oligotrophic aquatic environments* — with A. Doelman (UL/CWI), H. E. de Swart (UU), and J. Zijlstra (CWI)
- *Nonlinear dimension reduction for biochemical systems* — with H. Härdin (Uppsala U) and H. V. Westerhoff (VU/U Manchester/NISB)
- *Equation-free dimension reduction for multiscale systems* — with D. Lebiedz (U Freiburg), I. G. Kevrekidis (Princeton), C. W. Gear (Princeton/NEC - retired), T. J. Kaper (Boston U), H. G. Kaper (ANL - retired)

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## TEACHING EXPERIENCE

### *Graduate*

- 02/2011 – 05/2011** Asymptotic Methods for Differential Equations, Mastermath, Amsterdam, NL
- 01–04/02/2010** Graduate School on Mathematical and Computational Methods for the Sciences (HGS MathComp) course *Multi-scale Modeling and Simulation of Complex Chemical Reaction Networks*, Interdisciplinary Center for Scientific Computing (IWR)/U Heidelberg, Heidelberg, DE
- 07–11/01/2008** Winter School *Multiscale Modeling and Singular Perturbations*, U Twente, Enschede, NL

### *Undergraduate (lecturer)*

- 11/2010 – 12/2010** } Partial Differential Equations, U Twente
- 11/2009 – 12/2009** }
- 01/2009 – 05/2009** } Multivariate Calculus, U Amsterdam
- 01/2008 – 05/2008** }
- 01/2007 – 05/2007** }
- 05/2000 – 06/2000** Discrete Mathematics, Boston U

*Undergraduate (assistant)*

04/2011 – 06/2011	Ordinary Differential Equations, U Twente
11/2011 – 12/2011	{ Signals & Transformations, U Twente Partial Differential Equations, U Twente
09/2010 – 10/2010	} Vector Analysis for Technical Medicine, U Twente
09/2009 – 10/2009	
09/2008 – 12/2008	} Calculus, U Amsterdam
09/2007 – 12/2007	
01/2002 – 05/2002	} Multivariate Calculus, Boston U
09/2001 – 12/2001	
01/2001 – 05/2001	Differential Equations, Boston U
09/2000 – 12/2000	Calculus, Boston U

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## STUDENT SUPERVISION

- **Co-promotor** | Ph.D. Thesis – *Handling biological complexity: as simple as possible but not simpler* (H. Härdin), June 2010, VU
- **Supervisor** | B.Sc. Thesis – *Enzymkinetiek: ontwikkeling van en variaties op Michaelis–Menten kinetiek* (A. Elschot, J. Hebbink, and R. Zaalberg), June 2011, UT
- **Supervisor** | B.Sc. Thesis – *Lokaal Bifurcatiegedrag van Fytoplankton* (M. Bootsveld, J. Lansink Rotgerink, and E. van der Veen), June 2010, UT

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## PRESENTATIONS

- *Phytoplankton growth in oligotrophic oceans–linear theory*, Workshop on Ocean Ecologies, Mathematical Biosciences Institute/U Ohio, Columbus, OH, USA, June 20–July 01 2011
- *Emergence and annihilation of localized structures in a phytoplankton–nutrient system*, SIAM Conf. on Applications of Dynamical Systems, Snowbird, UT, USA, May 22–26 2011
- *Generation and annihilation of a localized structure in a plankton–nutrient model*, Workshop on Coherent Structures in Evolutionary Equations, Lorentz Center, Leiden, NL, July 12–16 2010
- *Enzyme Kinetics in the Presence of Diffusion*, AIMS Conf. on Dynamical Systems, Differential Equations and Applications, Technische U Dresden, Dresden, DE, May 25–28 2010
- *Phytoplankton–nutrient dynamics in oligotrophic oceanic environments*, Analysis Seminar, U Leiden Leiden, NL, February 18 2010
- *Phytoplankton–nutrient dynamics in oligotrophic oceanic environments*, Dynamic Analysis Seminar, Vrij U, Amsterdam, NL, February 17 2010
- *Phytoplankton–nutrient dynamics in oligotrophic oceanic environments*, Cluster of Modelling, Analysis and Simulation Cluster Seminar, CWI, Amsterdam, NL, September 22 2009
- *Approximation and convergence properties of the constrained runs algorithms*, SIAM Conf. on Applications of Dynamical Systems, Snowbird, UT, USA, May 17–21 2009
- *Computing the essential dynamics of multiscale systems algorithmically*, Dept. Of Applied Analysis, U Twente, Enschede, NL, November 24 2008
- *Computing the essential dynamics of multiscale systems algorithmically*, Workshop on Numerical Modeling of Complex Dynamical Systems, Lorentz Center, Leiden, NL, May 06–09 2008
- *Using the constrained runs algorithms to tabulate slow manifolds*, Conf. on Model reduction in reacting flow, Rome, IT, August 03–05 2007
- *Analysis of the constrained runs algorithms*, Conf. on Mathematics of Model Reduction, Leicester, UK, August 28–30 2007

- *Analysis of the constrained runs reduction schemes*, Invited Talk, 6th International Congress on Industrial and Applied Mathematics (ICIAM), Zurich, CH, July 16–20 2007
- *An introduction to the analysis and design of reduction methodologies*, Invited Talk, SIAM Conf. on Applications of Dynamical Systems, Snowbird, UT, USA, June 28–July 01 2007
- *Attracting invariant manifolds for systems with multiscale dynamics*, General Mathematics Colloquium, U Amsterdam, Amsterdam, NL, March 28 2007
- *Analysis of reduction methods for multiscale dynamics*, CASA Colloquium, Technische U Eindhoven, Eindhoven, NL, October 18 2006
- *A singularly perturbed eigenvalue problem from phytoplankton dynamics*, Invited Talk, Symposium on Resonance and Eigenvalues in Singular Perturbation Problems, Palais des Academies, Brussels, BE, June 15 2006
- *Dimension reduction algorithms: recent advances and future challenges*, Invited Talk, Workshop on Limit Problems in Analysis, Lorentz Center, Leiden, NL, May 01–05 2006
- *Analysis and opportunities for reduction methods in chemical kinetics*, SIAM Conf. on Numerical Combustion, Granada, ES, April 23–26 2006
- *Analysis of reduction methods for multiscale problems*, NWO Kick-Off Workshop on Mathematics Of Life Sciences (NDNS+), Groningen, NL, October 10–13 2005
- *A unifying framework for reduction methods*, Invited Talk, SIAM Conf. on Applications of Dynamical Systems, Snowbird, UT, USA, May 22–26 2005
- *Asymptotic analysis of the Computational Singular Perturbation reduction method for chemical kinetics* (poster), 30th International Conf. on Combustion, Chicago, IL, USA, July 25–30 2004
- *The effects of diffusion for chemical-kinetic reduction* (poster), 30th International Conf. on Combustion, Chicago, IL, USA, July 25–30 2004
- *Analysis of reduction methods for large systems of ODEs*, Cluster of Modelling, Analysis and Simulation, CWI, Amsterdam, NL, June 30 2004
- *Analysis of the Computational Singular Perturbation (CSP) reduction method for chemical kinetics* (poster), 10th International Conf. on Numerical Combustion, Sedona, AZ, USA, May 09–12 2004
- *Analysis of the CSP reduction method of Lam & Goussis for chemical kinetics*, Invited Talk, SIAM Conf. on Applications of Dynamical Systems, Snowbird, UT, USA, May 27–31 2003
- *Analysis of the ILDM and CSP reduction methods for chemical kinetics*, Dept. of Mathematics and Statistics, Boston U, Boston, MA, USA, May 05 2003

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## COMMUNITY SERVICE

- **Organizer** | Winter School – *Evolution Equations in an Applied Context*, U Twente, Enschede, NL, 13-17 December 2010 (*with S. van Gils, A. W. Heemink, and M. A. Peletier*)
  - **Organizer** | Minisymposium – *Modeling and Analysis of Oceanic Phytoplankton Growth* in SIAM Conf. on Applications of Dynamical Systems (SIAM DS11), Snowbird, UT, May 2011 (*with A. Doelman*)
  - **Organizer** | Minisymposium – *Dynamical Systems Based Reduction Methods for Large-Scale Systems* in SIAM Conf. on Applications of Dynamical Systems (SIAM DS09), Snowbird, UT, May 2009 (*with D. Lebedz and T. J. Kaper*)
  - **Organizer** | Minisymposium – *Dimension Reduction Methodologies for Spatially Extended Systems* in SIAM Conf. on Applications of Dynamical Systems (SIAM DS07), Snowbird, UT, May 2007 (*with P. Van Leemput*)
  - **Organizer** | KdVI Dynamics Seminar in UvA, 2008–2009
  - **Reviewer** | SIAM J. Appl. Dyn. Sys., SIAM J. Math. Anal., SIAM Multiscale Model. Simul., J. Comp. Phys., J. Math. Anal. Appl., Math. Comp. Simul., Phys. D, Entropy
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## AWARDS

<b>2010</b>	<b>Nomination</b>   U Twente, Mathematics department's <i>Lecturer of the Year</i> Award, Enschede, NL
<b>2008</b>	<b>Nomination</b>   U Amsterdam's <i>Lecturer of the Year</i> Award, Amsterdam, NL
<b>09/2006 – 08/2009</b>	<i>Veni</i> grant, Netherlands Organization for Scientific Research (NWO), The Hague, NL
<b>06/2002 – 04/2005</b>	} Research Fellowship, Boston U, Boston, MA, USA
<b>06/2001 – 08/2001</b>	
<b>09/2000 – 05/2002</b>	Teaching Fellowship, Boston U, Boston, MA, USA
<b>09/1999 – 05/2000</b>	Presidential University Graduate Fellowship, Boston U, Boston, MA, USA
<b>09/1993 – 07/1997</b>	Award for academic excellence, Greek National Fellowships Foundation (I.K.Y.), Athens, Greece

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## PROFESSIONAL SOCIETIES MEMBERSHIP

- Society for Industrial and Applied Mathematics (SIAM)

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## LANGUAGES

**English:** Fluent  
**Dutch:** Good  
**French:** Basic  
**Greek:** Native

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## REFERENCES

### Prof. Arjen Doelman

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Amsterdam, The Netherlands  
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### Prof. Tasso J. Kaper

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### Dr. C. William Gear

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