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Computer Programming

Associate Professor in &

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Employment History

- 09.2023 – Present
- ◇ **Assistant Professor**, Computer Programming, Department of Computer Technologies, Antalya Bilim University, 07190 Antalya, Turkey.
 - ◇ **Assistant Professor (cross-appointed faculty)**, College of Business, Antalya Bilim University, Antalya 07190, Turkey.
- 03.2022 – 09.2023
- ◇ **Dr. Lecturer**, Computer Programming, Department of Computer Technologies, Antalya Bilim University, Antalya 07190, Turkey.
 - ◇ **Dr. Lecturer (cross-appointed faculty)**, College of Business, Antalya Bilim University, Antalya 07190, Turkey.
- 12.2017 – 03.2022
- ◇ **Lecturer**, Computer Programming, Department of Computer Technologies, Antalya Bilim University, Antalya 07190, Turkey.
 - ◇ **Lecturer (cross-appointed faculty)**, College of Business, Antalya Bilim University, Antalya 07190, Turkey.
- 09.2014 – 12.2017
- ◇ **Research Assistant**, Department of Economics, Antalya Bilim University, Antalya 07190, Turkey.

Administrative


- 12.2023 – ...
- ◇ **Head of Department**, Computer Programming, Department of Computer Technologies, Vocational School, Antalya Bilim University. [web-page](#) (in Turkish)

Education


- 2014 – 2022
- ◇ **Ph.D. – Scientific Computing**, Institute of Applied Mathematics, Middle East Technical University, 06800 Ankara, Turkey
Thesis title: *Stabilized Finite Element Simulations of Multispecies Inviscid Hypersonic Flows in Thermochemical Nonequilibrium* [thesis-link](#)
Advisors: Prof. Ömür Uğur & Prof. Tayfun E. Tezduyar
- 2012 – 2014
- ◇ **M.Sc. – Mathematics**, Applied Mathematics, Graduate School of Natural and Applied Sciences, Nevşehir Hacı Bektaş Veli University, 50300 Nevşehir, Turkey
Special student in Engineering Sciences at Middle East Technical University
Thesis title: *Asymptotic Analysis of Singular Perturbation Problems*
Advisors: Dr. Aytekin Eryılmaz & Dr. M. Tarık Atay
- 2008 – 2012
- ◇ **B.Sc. – Mathematics**, Department of Mathematics, Niğde Ömer Halisdemir University, 51240 Niğde, Turkey
Graduation project: *Dual Spaces*.

Academic Facilities


9.2024 – 9.2025

- (postponed) ♦ **Postdoctoral research associate**, Mathematical Institute, University of Oxford, Oxford OX2 6GG, UK.
Advisor: Prof. Patrick E. Farrell  [web-page](#)

3.2022 – 9.2022

- ♦ **Postdoctoral research associate**, Mechanical Engineering, Rice University, Houston, TX 77005, US.
Advisor: Prof. Tayfun E. Tezduyar  [web-page](#)

May 2017

- ♦ **Erasmus+ visiting staff**, The Interdisciplinary Center for Scientific Computing (IWR), Ruprecht-Karls University of Heidelberg, 69120 Heidelberg, Germany.
Advisor: Prof. Anna Marciniak-Czochra  [web-page](#)

Research

Research Interests

- ♦ My research interests cover many computational areas associated with engineering sciences and mathematics, including:
- (Stabilized) Finite Element Methods (FEM)
 - Asymptotic Methods
 - Numerical Analysis
 - Scientific Machine Learning (SciML)
 - Scientific Computing & Programming
 - Computational Heat and Mass Transfer
 - Differential Equations (ODE & PDE)
 - Computational Fluid Dynamics (CFD)
 - Aerodynamics & High-speed Flow Computations
 - Computational Physics & Biology
 - Engineering Simulations
 - Computational Finance

Journal Publications

- ♦ **Cengizci S.** A SUPS formulation for simulating natural/mixed heat convection in square cavities under intense magnetic effects, *The European Physical Journal Plus*, 139:713, **2024**. doi: <https://doi.org/10.1140/epjp/s13360-024-05481-9>.
- ♦ **Cengizci S.**, Uğur Ö. A computational study for simulating MHD duct flows at high Hartmann numbers using a stabilized finite element formulation with shock-capturing, *Journal of Computational Science*, 81:102381, **2024**. doi: <https://doi.org/10.1016/j.jocs.2024.102381>.
- ♦ **Cengizci S.**, Uğur Ö. A computational study for pricing European- and American-type options under Heston's stochastic volatility model: application of the SUPG- $\text{YZ}\beta$ formulation, *Computational Economics*, **2024**. doi: <https://doi.org/10.1007/s10614-024-10704-3>.
- ♦ **Cengizci S.**, Öztop H. F., Mülayim G. Natural convection in nanofluid-filled quadrantal cavities under magnetic field: Application of the SUPS formulation, *Numerical Heat Transfer, Part B: Fundamentals*, **2024**. doi: <https://doi.org/10.1080/10407790.2024.2370515>.
- ♦ **Cengizci S.**, Öztop H. F., Mülayim G. Stabilized finite element simulation of natural convection in square cavities filled with nanofluids under different temperature boundary conditions, *International Communications in Heat and Mass Transfer*, 156:107655, **2024**. doi: <https://doi.org/10.1016/j.icheatmasstransfer.2024.107655>.
- ♦ **Cengizci S.**, Uğur Ö., Natesan S. SUPG-based stabilized finite element computations of convection-dominated 3D elliptic PDEs using shock-capturing, *Journal of Computational and Applied Mathematics*, 451:116022, **2024**. doi: <https://doi.org/10.1016/j.cam.2024.116022>.
- ♦ **Cengizci S.**, Uğur Ö., Natesan S. Stabilized finite element method for convection-dominated problems with time-fractional derivatives, *Journal of Computational Science*, 76:102214, **2024**. doi: <https://doi.org/10.1016/j.jocs.2024.102214>.
- ♦ **Cengizci S.**, Uğur Ö. A comparative and illustrative study for solving singularly perturbed problems with two parameters, *TWMS Journal of Applied and Engineering Mathematics*, 14(2):520–536, **2024**. <https://jaem.isikun.edu.tr/web/images/articles/vol.14.no.2/07.pdf>.
- ♦ **Cengizci S.** An enhanced SUPG-stabilized finite element formulation for simulating natural phenomena governed by coupled system of reaction-convection-diffusion equations, *Mathematical Modelling and Numerical Simulation with Applications*, 3(4):297–317, **2023**. doi: <http://dx.doi.org/10.53391/mmnsa.1387125>
- ♦ **Cengizci S.**, Natesan S. Hybridized successive complementary expansions for solving convection-dominated 2D elliptic PDEs with boundary layers, *Computational and Applied Mathematics*, 42(6):273, **2023**. doi: <https://doi.org/10.1007/s40314-023-02411-w>.

Research (continued)

- ◇ **Cengizci S.**, Uğur Ö., Natesan S. A SUPG formulation augmented with shock-capturing for solving convection-dominated reaction-convection-diffusion equations, *Computational and Applied Mathematics*, 42(5):235, **2023**. doi: <https://doi.org/10.1007/s40314-023-02370-2>.
- ◇ **Cengizci S.**, Uğur, Ö. SUPG formulation augmented with $YZ\beta$ shock-capturing for computing shallow-water equations, *ZAMM-Zeitschrift für Angewandte Mathematik und Mechanik*, **2023**. doi: <https://doi.org/10.1002/zamm.202200232>.
- ◇ **Cengizci S.**, Uğur, Ö. A stabilized FEM formulation with discontinuity-capturing for solving Burgers'-type equations at high Reynolds numbers, *Applied Mathematics and Computation*, 442:127705, **2023**. doi: <https://doi.org/10.1016/j.amc.2022.127705>.
- ◇ **Cengizci S.**, Kumar D., Atay M.T. A semi-analytic method for solving singularly perturbed twin-layer problems with a turning point, *Mathematical Modelling and Analysis*, 28(1):102-117, **2023**. doi: <https://doi.org/10.3846/mma.2023.14953>.
- ◇ **Cengizci S.**, Uğur Ö., Natesan S. SUPG- $YZ\beta$ computation of chemically reactive convection-dominated nonlinear models, *International Journal of Computer Mathematics*, 100(2):283-303, **2023**. doi: <https://doi.org/10.1080/00207160.2022.2114794>.
- ◇ **Cengizci S.**, Dursun Cengizci A., Uğur Ö. A mathematical model for human-to-human transmission of COVID-19: a case study for Turkey's data, *Mathematical Biosciences and Engineering*, 18(6):9787-9805, **2021**. doi: <https://doi.org/10.3934/mbe.2021480>.
- ◇ **Cengizci S.** A comparison between MMAE and SCEM for solving singularly perturbed linear boundary layer problems, *Filomat*, 33(7):2135-2148, **2019**. doi: <https://doi.org/10.2298/FIL1907135C>.
- ◇ **Cengizci S.**, Natesan S., Atay M. T. An asymptotic-numerical hybrid method for singularly perturbed system of two-point reaction-diffusion boundary-value problems, *Turkish Journal of Mathematics*, 43(1):460-472, **2019**. doi: <https://doi.org/10.3906/mat-1807-195>.
- ◇ **Cengizci S.** An asymptotic-numerical hybrid method for solving singularly perturbed linear delay differential equations. *International Journal of Differential Equations*, **2017**, Article ID 7269450, 2017. doi: <https://doi.org/10.1155/2017/7269450>.
- ◇ Atay M. T., **Cengizci S.**, Eryilmaz, A. SCEM approach for singularly perturbed linear turning mid-point problems with an interior layer, *New Trends in Mathematical Sciences*, 4(1):115-124, **2016**. doi: <https://doi.org/10.20852/ntmsci.2016115661>.
- ◇ **Cengizci S.**, Atay M.T., Eryilmaz A. A uniformly valid approximation algorithm for nonlinear ordinary singular perturbation problems with boundary layer solutions, *SpringerPlus*, 5(280), **2016**. doi: <https://doi.org/10.1186/s40064-016-1865-6>.
- ◇ **Cengizci S.**, Eryilmaz A. Successive complementary expansion method for solving Troesch's problem as a singular perturbation problem, *International Journal of Engineering Mathematics*, Article ID 949463, **2015**. doi: <https://doi.org/10.1155/2015/949463>.

Articles in review & on-going work

- ◇ **Cengizci S.**, Uğur Ö. Stabilized finite element computation of non-reacting inviscid high-speed flows around a cylinder using $YZ\beta$ shock-capturing, **2024** (in progress).
- ◇ **Cengizci S.**, Uğur Ö. SUPG finite element computation of high-speed inviscid flows around a cylinder using $YZ\beta$ shock-capturing: II. Thermochemical nonequilibrium flows, **2023** (in progress).

Up-coming research

- ◇ Stabilized finite element computation of Onsager-Stefan-Maxwell equations
- ◇ Numerical solution of various tumor invasion models under convection dominance
- ◇ Numerical solution of partial integro-differential equations with convective terms
- ◇ Reservoir modeling within porous media
- ◇ Computational fluid dynamics simulations for urban planning
- ◇ Numerical solution of drift-diffusion equations arising in semiconductor theory
- ◇ Asymptotic and numerical methods for computational optics/photonics
- ◇ Computational Peridynamics
- ◇ Machine learning (ML) methods for computational science
- ◇ Artificial intelligence (AI) for science

Research (continued)

Conference Presentations

- ◇ **Cengizci S.** Finite element analysis of natural convection phenomena occurring within nanofluid-filled 3D cavities. The 7th International Conference on Mathematical Modelling, Applied Analysis and Computation (ICMMAAC-24), April 18–20, **2024**, Beirut, Lebanon. <https://soas.lau.edu.lb/conferences/icmmaac-24/>.
- ◇ **Cengizci S.** Applications of the SUPG- YZ/β finite element formulation: from mussel-algae interactions to Schnakenberg reaction models. The Eighth International Conference on Computational Mathematics and Engineering Sciences (CMES-2024), May 17–19, **2024**, Sanliurfa, Turkey. <https://www.cmescongress.org/>.
- ◇ **Cengizci S., Öztöp H. F. Mülayim G.** An application of the SUPG/PSPG finite element formulation for simulating natural convection heat transfer inside nanoliquid-filled 2D cavities. International Conference on Applied Mathematics in Engineering (ICAME'24), June 26–28, **2024**, Balikesir, Turkey. <https://icame.balikesir.edu.tr/>.
- ◇ **Cengizci S., Uğur Ö.** Pricing European- and American-type options under stochastic volatility: a computational study. Fifth Romanian Itinerant Seminar on Mathematical Analysis and its Applications, May 26–28, **2023**, Craiova, Romania. <http://rismaa.ucv.ro/>.
- ◇ **Cengizci S.** Stabilized finite element simulations of dam-break problems. International E-Conference on Mathematical and Statistical Sciences: A Selçuk Meeting, October 20–22, **2023**, Selçuk University, Konya, Turkey. <https://icomss22.selcuk.edu.tr/>.
- ◇ **Cengizci S.** Stabilized finite element computations augmented with shock-capturing: 3D convection-diffusion equations. International Conference on Analysis and Applied Mathematics (ICAAM), October 31–November 6, **2022**, Antalya, Turkey. <http://icaam-online.org/>.
- ◇ **Cengizci S., Uğur Ö., Natesan S.** Stabilized finite element simulations for Burgers'-type equations, International Conference on Analysis and Its Applications (ICAA NEPAL 2021), April 9–11, **2021**, Kathmandu University, Dhulikhel, Nepal. <http://icaa2021.ku.edu.np/>.
- ◇ **Cengizci S., Uğur Ö., Tezduyar T.E.** Stabilized numerical simulations of hypersonic flows in thermochemical nonequilibrium with FEniCS, FEniCS2021, 22–26 March **2021**, University of Cambridge, Virtual Conference. <https://fenics2021.com/talks/cengizci.html>.
- ◇ **Cengizci S., Uğur Ö.** SUPG-stabilized finite element formulation of shallow-water equations. International Conference of Young Mathematicians, June 3–5, **2021**, Institute of Mathematics of NAS of Ukraine, Kyiv, Ukraine. <https://www.imath.kiev.ua/~young/youngconf2021/index.php?lang=en>.
- ◇ **Cengizci S., Uğur Ö., Takizawa K., Tezduyar T.E.** A streamline-upwind/Petrov–Galerkin formulation for supersonic and hypersonic flow simulations, The 20th Biennial Computational Techniques and Applications Conference (CTAC2020), 30th Aug–2nd Sep **2020**, Sydney, NSW, Australia. <https://www.ctac2020.unsw.edu.au/>.
- ◇ **Cengizci S., Uğur Ö., Natesan S.** A stabilized finite element formulation for numerical simulation of convection-dominated reactive models, Advances in Differential Equations and Numerical Analysis (ADENA), October 12–14, **2020**, Indian Institute of Technology Guwahati, India. <https://www.iitg.ac.in/maths/ext/adena2020/>.
- ◇ **Cengizci S.** Some numerical experiments on singularly perturbed problems with multi-parameters, 8th International Eurasian Conference on Mathematical Sciences and Applications (IECMSA-2019), August 27–30, **2019**, Baku, Azerbaijan. <http://www.iecmsa.org/2019/>.
- ◇ **Cengizci S.** Some comparisons between MMAE and SCEM for solving singularly perturbed linear problems, The Third International Conference on Computational Mathematics and Engineering Sciences (CMES2018), May 4–6, **2018**, Girne, Cyprus.
- ◇ **Cengizci S., Eryilmaz A.,** “A hybrid approach for solving singularly perturbed turning point problems exhibiting dual layers”, International Conference on Mathematics and Mathematics Education (ICMME-2016), May 12–14, **2016**, Firat University, Elazığ, Turkey. <http://theicmme.org/2016/Default.aspx>.
- ◇ **Cengizci S., Atay M.T., Eryilmaz A.** A uniformly valid approximation algorithm for singularly perturbed two-point boundary value problems in nonlinear ordinary differential equations, International Conference on Advancements in Mathematical Sciences, November 5–7, **2015**, Antalya, Turkey.

Research Projects

- ◇ **TÜBİTAK–2219:** *Stabilized finite element methods for simulating convection-dominated multicomponent transport phenomena.* International Postdoctoral Research Fellowship Program for Turkish Citizens by the Scientific and Technological Research Council of Turkey. Budget: more than EUR 28,200.

Teaching

◇ The courses I have been teaching since 2017 as a Lecturer/Asst. Prof. at Antalya Bilim University:

- Calculus for Social Sciences I–II (Dept. of Business Adm.) ×6
- Mathematics I–II (Dept. of Economics) ×3
- Introduction to Linear Algebra (Dept. of Business Adm.) ×6
- Professional English (Computer Prog.) ×1
- Computer Hardware (Computer Prog.) ×3
- Information Technologies (multi-dept.) ×2
- Business Analytics (Dept. of Business Adm.) ×1
- Numerical Analysis for Engineers (Eng. Faculty) ×1
- Advanced Engineering Mathematics (Dept. of Mechanical Eng.) ×1
- Statistics for Social Sciences (Dept. of Political Sciences) ×5
- Decision Analysis Techniques (multi-dept.) ×1
- Computer Security (Computer Prog.) ×1
- Technical Mathematics (Dept. of Architecture) ×3
- Introduction to Programming II (Python Programming for Computer Prog.) ×2
- Fluid Mechanics I (Dept. of Mechanical Eng.) ×1
- Introduction to Numerical Methods (Dept. of Business Adm.) ×1

◇ The courses I assisted between 2014–2017 as a Teaching Assistant at Antalya Bilim University:

- Calculus for Social Sciences I–II (Dept. of Economics) ×2
- Introduction to Linear Algebra (Dept. of Business Adm.) ×2
- Mathematical Economics (Dept. of Economics) ×1
- Microeconomics (Dept. of Economics) ×1

Skills

Languages ◇ Turkish, English, German (beginner)

Coding & Software ◇ Python, C++, Matlab, L^AT_EX, Linux (Ubuntu), FEniCS, Firedrake (beginner), SU2 (beginner)

Miscellaneous

Referee/Reviewer

International journals (indexed in WoS) I have been reviewing for:

- Numerical Algorithms
- Computational and Applied Mathematics
- Zeitschrift für angewandte Mathematik und Physik (ZAMP)
- Mathematical Sciences
- Heliyon
- Mathematical Methods in the Applied Sciences
- Gazi University Journal of Science
- Computational Economics
- Journal of Porous Media
- Journal of Nonlinear Modeling and Analysis
- Physics of Fluids
- Numerical Heat Transfer, Part A: Applications
- Journal of Computational and Applied Mathematics
- Neural Processing Letters
- Mathematical Modelling and Analysis
- Differential Equations and Dynamical Systems
- Journal of Applied Mathematics
- Hacettepe Journal of Mathematics and Statistics
- Applied Mathematics-A Journal of Chinese Universities

Other Teaching Experience

2019–2021 ◇ **International Baccalaureate Math Teacher**, Antalya Yusuf Ziya Öner High School for Science, Antalya 07192, Turkey.

Certification

2019 ◇ **Educator** – Mathematics for the International Baccalaureate (IB) Diploma: Higher Level. Awarded by the IB.


Miscellaneous (continued)

- 2014 ◇ **Educator** – Mathematics for High Schools. Awarded by Faculty of Education, Akdeniz University, Antalya 07058, Turkey.


Panelist


- 2019 ◇ **Observer Panelist**, Mathematics and Physics Research Group, The Scientific and Technological Research Council of Turkey (TÜBİTAK), 18.09.2020.


Academic Awards


- ◇ **Doctoral thesis award**, Middle East Technical University, 2023.  [Link](#)
- ◇ **Academic publication encouragement award**, Antalya Bilim University (×3)
- ◇ **Publication encouragement award**, The Scientific and Technological Research Council of Turkey (TUBITAK) UBYT (×2)

References

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