Curriculum Vitae **Hamdullah Yücel**

PERSONAL DATA

Institute of Applied Mathematics
Middle East Technical University, Ankara, TURKEY
Office : S231
Phone : +90 312 210 5607
Fax : +90 312 210 2985
E-mail : yucelh@metu.edu.tr
WWW : https://blog.metu.edu.tr/yucelh
Date of Birth : October 12, 1984
Place of Birth : Çorum, TURKEY
Citizenship : Turkish (TC)

RESEARCH INTERESTS

PDE–Constrained Optimization, Discontinuous Galerkin Methods, Adaptive Finite Element Methods, Phase Field Models, Uncertainty Quantification, Deep Learning Techniques for PDEs

EDUCATION

Middle East Technical University, Ankara, TURKEY

Ph.D., Scientific Computing Program, Institute of Applied Mathematics, July 2012,

- Dissertation Title: *"Adaptive Discontinuous Galerkin Methods For Convection Dominated Optimal Control Problems"*
- Advisor: Prof. Dr. Bülent Karasözen

B.S., Department of Mathematics, June 2007

RESEARCH VISITS

September 2010-June 2011, Department of Computational and Applied Mathematics, Rice University, Houston, USA

- supervised by Prof. Dr. Matthias Heinkenschloss
- supported by 2214-International Doctoral Research Fellowship Programme, Turkish Scientific and Technical Research Council (TÜBİTAK)

October 2008-December 2008, Department of Mathematics, Technische Universität Darmstadt, GERMANY

- supervised by Prof. Dr. Stefan Ulbrich
- supported by project: Optimization Theory, Methods and Applications, subject-related partnerships with universities in developing countries, German Academic Exchange Service (DAAD)

EMPLOYMENT

Middle East Technical University, Ankara, TURKEY

October 2020 -	Associate Professor Institute of Applied Mathematics
April 2017-October 2020	Assistant Professor Institute of Applied Mathematics

Middle East Technical University, Ankara, TURKEY

July 2016-August 2016	Part-time Lecturer Department of Mathematics
February 2016-June 2016	Part-time Lecturer Institute of Applied Mathematics

TED University, Ankara, TURKEY

February 2016-June 2016	Part-time Lecturer Basic Science Unit

Max Planck Institute for Dynamics of Complex Technical Systems, Magdeburg, GERMANY

October 2012-September 2015	Postdoctoral Researcher Computational Methods in Systems and Control Theory

Middle East Technical University, Ankara, TURKEY

September 2007-September 2012	Research Assistant Department of Mathematics
April 2007-June 2007	Student Assistant Institute of Applied Mathematics

Awards

"Science Academy's Young Scientist Awards Program (BAGEP), 2022

"Thesis of the Year Award", Middle East Technical University, Ankara, TURKEY, 2013

Turkish Scientific and Technical Research Council (TÜBİTAK)

October 2007-July 2012	2211-Doctorate Scholarship
September 2011	2224-Travel Award
September 2010-June 2011	2214-International Doctoral Research Fellowship

German Academic Exchange Service (DAAD) Scholarship, October-December 2008

Language Skills

Turkish (native), English (fluently), German (A2)

Computer Skills

Proficient in Matlab,
Working Knowledge of C, C++, HTML, Python, SQL

Projects

- Cost European Cooperation in Science & Technology (MC Member)
  - **Title** : Mathematical Models for Interacting Dynamics on Networks
  - **Project No** : COST Action CA18232
  - **Year** : October 04 2019–October 03 2023
- Turkish Scientific and Technical Research Council (TÜBİTAK)
  - TÜBİTAK 1001 (Coordinator)
    - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, Middle East Technical University, Ankara, TURKEY
    - **Year** : August 01 2019–August 01 2021
    - **Title** : Numerical Studies for Petrol and Gas Reservoir Problems
    - **Project No** : TUBITAK 1001–119F022
- Scientific Research Projects, METU
  - BAP, Research Project (Coordinator)
    - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, Middle East Technical University, Ankara, TURKEY
    - **Year** : January 20 2022–January 20 2023
    - **Title** : Adaptive Multilevel Monte Carlo Methods for Robust Optimal Control Problems
    - **Project No** : GAP-705-2022-10821
  - BAP, Career Development Project (Coordinator)
    - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, Middle East Technical University, Ankara, TURKEY
    - **Year** : May 29 2018–May 29 2019
    - **Title** : Numerical Studies of Korteweg-de Vries Equation with Random Input Data
    - **Project No** : YÖP–705–2018–2820
  - BAP, Research Project (Coordinator)
    - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, Middle East Technical University, Ankara, TURKEY
    - **Year** : January 01 2017–December 31 2017
    - **Title** : Model Order Reduction Techniques for Cross Diffusion Systems
    - **Project No** : BAP–07–05–2017–005
  - BAP, Research Project (Researcher)
    - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, Middle East Technical University, Ankara, TURKEY
    - **Year** : January 01 2014–December 31 2014
    - **Title** : Multigrid Methods for Optimal Control Problems governed by Convection–Diffusion Equations
    - **Project No** : BAP–07–05–2014–003

- BAP, Thesis Project (Researcher)
  - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, Middle East Technical University, Ankara, TURKEY
  - **Year** : January 01 2012–December 31 2012
  - **Title** : Model Order Reduction Techniques for Convection Dominated Optimal Control Problems
  - **Project No** : BAP–07–05–2012–101
- BAP, Research Project (Researcher)
  - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, Middle East Technical University, Ankara, TURKEY
  - **Year** : January 01 2009–December 31 2009
  - **Title** : Derivative Free Methods for Multilevel Optimal Control Problems
  - **Project No** : BAP–07.05.2009.01

Publications

Journal Articles Published/Accepted:

- P. Çiloğlu and H. Yücel, *Stochastic discontinuous Galerkin methods with low–rank solvers for convection diffusion equations*, Applied Numerical Mathematics 172, 157-185, 2022, doi: 10.1016/j.apnum.2021.10.007.
- L. Eksert, H. Yücel, and E. Onur, *Intra- and Inter-cluster link scheduling in CUPS-based ad hoc networks*, Computer Networks 185, 107659, 2021, doi: 10.1016/j.comnet.2020.107659.
- H. Yücel, *Goal–oriented a posteriori error estimation for Dirichlet boundary control problems*, Journal of Computational and Applied Mathematics (381), 113012, 2021, doi:10.1016/j.cam.2020.113012.
- H. Yücel, M. Stoll and P. Benner, *Adaptive discontinuous Galerkin approximation of optimal control problems governed by transient convection-diffusion equations*, Electronic Transactions on Numerical Analysis (ETNA) 48, 407–434, 2018, doi: 10.1553/etna_vol48s407.
- M. Stoll and H. Yücel, *Symmetric interior penalty Galerkin method for fractional–in–space phase-field equations*, AIMS Mathematics 3(1), 66-95, 2018, doi: 10.3934/Math.2018.1.66.
- B. Karasözen, M. Uzunca, Ayşe Sarıaydın-Filibelioğlu, and Hamdullah Yücel, *Energy stable discontinuous Galerkin finite element method for the Allen–Cahn equation*, International Journal of Computational Methods 15(3), 1850013, 2018, doi: 10.1142/S0219876218500135.
- P. Benner, and H. Yücel, *Adaptive symmetric interior penalty Galerkin method for boundary control problems*, SIAM Journal on Numerical Analysis 55(2), 1101–1133, 2017, doi:10.1137/15M1034507.

- M. Uzunca, T. Küçükseyhan, H. Yücel, and B. Karasözen, *Optimal control of convective FitzHugh-Nagumo equation*, Computers & Mathematics with Applications 73(9), 2151–2169, 2017, doi:10.1016/j.camwa.2017.02.028.

- H. Yücel, M. Stoll, and P. Benner, *A discontinuous Galerkin method for optimal control problems governed by a system of convection-diffusion PDEs with nonlinear reaction terms*, Computers & Mathematics with Applications 70(10), 2414-2431, 2015, doi:10.1016/j.camwa.2015.09.006.

- H. Yücel, and P. Benner, *Adaptive discontinuous Galerkin methods for state constrained optimal control problems governed by convection diffusion equations*, Computational Optimization and Applications 62(1), 291-321, 2015, doi:10.1007/s10589-014-9691-7.

- Z. K. Seymen, H. Yücel, and B. Karasözen, *Distributed optimal control of time-dependent diffusion-convection-reaction equations using space-time discretization*, Journal of Computational and Applied Mathematics (261), 146-157, 2014, doi:10.1016/j.cam.2013.11.006.

- T. Akman, H. Yücel, and B. Karasözen, *A priori error analysis of the upwind symmetric interior penalty Galerkin (SIPG) method for the optimal control problems governed by unsteady convection diffusion equations*, Computational Optimization and Applications (57), 703-729, 2014, doi:10.1007/s10589-013-9601-4.

- H. Yücel, and B. Karasözen, *Adaptive symmetric interior penalty Galerkin (SIPG) method for optimal control of convection diffusion equations with control constraints*, Optimization (63), 145-166, 2014, doi:10.1080/02331934.2013.801474.

- H. Yücel, M. Stoll, and P. Benner, *Discontinuous Galerkin finite element methods with shock-capturing for nonlinear convection dominated models*, Computers & Chemical Engineering (58), 278-287, 2013, doi:10.1016/j.compchemeng.2013.07.011.

Journal Articles in Review:

- S. C. Toraman, and H. Yücel, *Stochastic momentum methods for optimal control problems containing uncertain inputs*. Submitted 2021.

- P. Çiloğlu, and H. Yücel, *Stochastic discontinuous Galerkin methods for robust deterministic control of convection diffusion equations with uncertain coefficients*. Submitted 2021.

Conference Proceedings (Refereed) Published:

- H. Yücel *Residual based a posteriori error estimation for Dirichlet boundary control problems*, ESAIM: ProcS 71 185-195, 2021, doi:10.1051/proc/202171185.

- H. Yücel, and P. Benner, *Distributed optimal control problems governed by coupled convection dominated PDEs with control constraints*, in Assyr Abdulle, Simone Deparis, Daniel Kressner, Fabio Nobile, and Marco Picasso: Numerical Mathematics and Advanced Applications - ENUMATH 2013, Lecture Notes in Computational Science and Engineering, Springer International Publishing, 469-478, 2015, doi:10.1007/978-3-319-10705-9_46.

- B. Karasözen, and H. Yücel, *Optimal control of diffusion-convection-reaction equations using upwind symmetric interior penalty Galerkin (SIPG) method*, in Stavros G. Stavrinides, Santo Banerjee, Suleyman Hikmet Caglar, Mehmet Ozer: Chaos and Complex Systems, Springer Berlin Heidelberg, 83-94, 2013, doi:10.1007/978-3-642-33914-1_11.

- H. Yücel, M. Heikenschloss, and B. Karasözen, *Distributed optimal control of diffusion-convection-reaction equations using discontinuous Galerkin methods*, in Andrea Cangiani, Ruslan L. Davidchack, Emmanuil Georgoulis, Alexander N. Gorban, Jeremy Levesley, Michael V. Tretyakov: Numerical Mathematics and Advanced Applications 2011, Springer Berlin Heidelberg, 389-397, 2013, doi:10.1007/978-3-642-33134-3_42.

Scientific Meetings

Research Talks:

2022

- *Solving PDE–Constrained Optimization Problems Containing Random Coefficients,* Cost Action Mat-Dyn-Net WG3+WG5 Meeting, Namur, May 18-20, 2022.

2020

- *Partial Differential Equations with Random Input Data,* Cost Action Mat-Dyn-Net Meeting in Zagreb, Zagreb, February 24-27, 2020.

2019

- *Goal–Oriented a Posteriori Error Estimation for Dirichlet Boundary Control Problems,* 19th French-German-Swiss conference on Optimization (FGS'2019), Nice, September 17–20, 2019.

- *Adaptive Discontinuous Galerkin Methods for Optimal Control Problems,* Department of Physics, Middle East Technical University, Ankara, April 11, 2019.

2018

- *Boundary Control Problems,* Department of Mathematics, Çankaya University, Ankara, December 14, 2018.

- *Local Discontinuous Galerkin Methods for Dirichlet Boundary Control Problems*, Beyond: Workshop on Computational Science and Engineering, Ankara, October 20–21, 2018.

- *Goal–Oriented a Posteriori Error Estimation for Dirichlet Boundary Control Problems,* 5th European Conference on Computational Optimization (EUCCO 2018), Trier, September 10-12, 2018.

2017

- *A Local Discontinuous Galerkin Method for Dirichlet Boundary Control Problems,* 18th French-German-Italian Conference on Optimization, Paderborn, September 25-28, 2017.

2016

- *Adaptive Discontinuous Galerkin Methods for Optimal Control Problems,* Department of Mathematics, Atılım University, Ankara, December 14, 2016.

- *Numerical simulation of MHD duct flow problems using BEM and DGFEM approaches,* International Conference on Boundary Element and Meshless Techniques - BETEQ 2016, Ankara, July 11-13, 2016.

2015

- *Space-Time Discontinuous Galerkin Finite Element Approximation of Optimal Control Problems,* ENUMATH 2015 Conference, Ankara, September 14-18, 2015.

- *Fractional Allen-Cahn Equations,* 26th Biennial Numerical Analysis Conference, Glasgow, June 23-26, 2015.

- *Adaptive Symmetric Interior Penalty Galerkin Method for Boundary Control Problems,* Workshop on Numerical Methods for Optimal Control and Inverse Problems, Münich, March 09-11, 2015.

2014

- *Adaptive discontinuous Galerkin methods for convection dominated optimal control problems*, Lothar-Collatz-Seminar, Hamburg, December 16, 2014.

- *Unsteady optimal control problems arising from chemical processes*, 4th European Seminar on Computing (ESCO 2014), Pilsen, June 15 - 20, 2014.

- *Adaptive discontinuous Galerkin approximation of optimal control problems governed by transient convection-diffusion equations*, International Conference on Applied Mathematical Optimization and Modelling (APMOD Conference 2014), Coventry, April 9-11, 2014.
- *Adaptive discontinuous Galerkin approximation of optimal control problems governed by transient convection-diffusion equations*, Workshop on Numerical Methods for Optimal Control and Inverse Problems, Münich, March 03-05, 2014.

2013

- *Convection dominated optimal control problems arising from chemical processes*, Center Dynamic Systems (CDS): Biosystems Engineering, CDS Status Seminar, Magdeburg, November 20, 2013.
- *Optimal control problems governed by a system of convection-diffusion PDEs with nonlinear reaction terms*, Institute of Applied of Mathematics, METU, Ankara, October 1, 2013.
- *Distributed optimal control problems governed by coupled convection dominated PDEs with control constraints*, ENUMATH 2013 Conference, Lausanne, August 26-30, 2013.
- *Adaptive discontinuous Galerkin (DG) methods for state constrained optimal control problems governed by convection dominated equations*, European Conference on Computational Optimization (EUCCO), Chemnitz, July 17-19, 2013.
- *Optimal control problems governed by a system of convection-diffusion PDEs with nonlinear reaction terms*, Workshop on Numerical Methods for Optimal Control and Inverse Problems, Münich, March 11-13, 2013.

2012

- *Adaptive discontinuous Galerkin methods for advection dominated optimal control problems*, International Research Training Group IGDK, TU Münich, Münich, July 13, 2012.
- *Adaptive discontinuous Galerkin methods for advection dominated optimal control problems*, Colloquium of the Modeling, Numerics, Differential Equations Group, TU Berlin, Berlin, June 12, 2012.
- *Adaptive discontinuous Galerkin methods for advection dominated optimal control problems*, Mathematical Optimization and Applications in Biomedical Sciences, Karl-Franzens-Universität, Graz, March 23, 2012.

2011

- *Distributed optimal control of diffusion-convection-reaction equations using discontinuous Galerkin methods*, ENUMATH 2011 Conference, Leicester, September 5-9, 2011.

2009

- *Distributed optimal control of unsteady Burgers and convection-diffusion-reaction equations using COMSOL Multiphysics*, Computational Techniques for Optimization Problems subject to Time-Dependent PDEs, Brighton, December 14-16, 2009.

Participation in International Scientific Meetings:

- Finite Element Rodeo 2011, College Station, Texas, February 25-26, 2011.
- Winterschool on Hierarchical Matrices, Max-Planck-Institute for Mathematics in the Sciences, Leipzig, March 2-6 2009.

Teaching Experience

Middle East Technical University, Ankara, TURKEY

Lecturer

- IAM 527 Advanced Calculus and Integration
- IAM 561 Introduction to Scientific Computing I
- IAM 562 Introduction to Scientific Computing II
- IAM 566 Numerical Optimization
- IAM 572 Finite Element Methods for Partial Differential Equations: Theory and Applications
- IAM 591 Programming Techniques in Applied Mathematics I
- IAM 592 Programming Techniques in Applied Mathematics II
- IAM 760 Special Topics: Model Order Reduction
- IAM 765 Special Topics: Advances topics in Finite Elements
- IAM 766 Special Topics: Optimal Control with Partial Differential Equations
- IAM 770 Special Topics: Discontinuous Galerkin Methods
- IAM 771 Special Topics: Optimization Methods for Machine Learning

- Math 120 Calculus of Functions of Several Variables
- Math 402 Introduction to Optimization

Teaching Assistant

- MATH 119 Calculus With Analytic Geometry Functions
- MATH 120 Calculus for Functions of Several Variables
- MATH 219 Introduction to Differential Equations
- MATH 250 Advanced Calculus in Statistics
- MATH 254 Introduction to Differential Equations
- MATH 480 Numerical Methods for Differential Equations

TED University, Ankara, TURKEY

Lecturer

- Math 102 Multivariable Calculus
- Math 112 Introduction to Multivariable Calculus and Linear Algebra

Supervised Students

- Ongoing PhD Thesis
  - Pelin Çiloğlu
    - **Title** : Stochastic Discontinuous Galerkin Methods for Optimal Control Problems with Random coefficients
  - Mustafa Kütük
    - **Title** : Deep Neural Network for Stochastic Partial Differential Equations
- Completed PhD Thesis
  - Halil Kaya (Co-Advisor)
    - **Institution** : Department of Aerospace Engineering, METU, Ankara, TURKEY
    - **Year** : August, 2020
    - **Title** : Development of a Discrete Adjoint-Based Aerodynamic Shape optimization for Natural Laminar Flows
    - **Advisor** : İ. Hakkı Tuncer, Department of Aerospace Engineering, METU
- Completed MSc Thesis

- H. Burak Bayrak (Co-Advisor)
  - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, METU, Ankara, TURKEY
  - **Year** : February 2022
  - **Title** : Competing Labels: A Heuristic Approach to Pseudo-Labeling in Deep Semi-Supervised Learning
  - **Advisor** : Şeyda Bolelli Ertekin, Department of Computer Engineering, METU
- S. Can Toraman (Advisor)
  - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, METU, Ankara, TURKEY
  - **Year** : January 2022
  - **Title** : Stochastic Momentum Methods for Optimal Control Problems governed by Convection–Diffusion Equations with Uncertain Coefficients
- Eda Oktay (Co-Advisor)
  - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, METU, Ankara, TURKEY
  - **Year** : September 2020
  - **Title** : Reevaluating Spectral Partitioning for Unsymmetric Matrices
  - **Advisor** : Murat Manguoğlu, Department of Computer Engineering, METU
- M. Alp Üreten (Advisor)
  - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, METU, Ankara, TURKEY
  - **Year** : September 2018
  - **Title** : Numerical Studies of Korteweg-de Vries Equation with Random Input Data
  - **Co–advisor** : Ömür Uğur, Scientific Computing Program, Institute of Applied Mathematics, METU
- Özgün Murat Arslantaş (Co-Advisor)
  - **Institution** : Scientific Computing Program, Institute of Applied Mathematics, METU, Ankara, TURKEY
  - **Year** : June 2015
  - **Title** : Multigrid Methods for Optimal Control Problems Governed by Convection-Diffusion Equations
  - **Advisor** : Bülent Karasözen, Department of Mathematics, METU

- Interns (Max Planck Institute)
  - Özgün Murat Arslantaş
    - **Institution** : Middle East Technical University, Ankara
    - **Visiting Period** : April 2014 - June 2014
    - **Title** : Multigrid Methods for Convection Dominated Optimal Control Problems

- Ulviyya Ibrahimli
  - **Institution** : Middle East Technical University, Ankara
  - **Visiting Period** : July 2013 - September 2013
  - **Title** : Implementation of Discontinuous Galerkin Methods

Conference Organization

- BEYOND 2019: Computational Science and Engineering Conference, September 09–11, Ankara, Turkey
- 4th National Insurance and Actuarial Sciences Congress, June 24–25, Ankara, Turkey
- BEYOND: Workshop on Computational Science and Engineering, October 20–21, Ankara, Turkey

Academic Memberships

Society for Industrial and Applied Mathematics (SIAM)
The Continuous Optimization Working Group of EURO (EUROPT)

References

References available upon request.