Prof. Dipl.-Ing. Dr. Karl Kunisch
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http://homepage.uni-graz.at/karl.kunisch/

CURRICULUM VITÆ

Personal Data

Date and place of birth:	September 16, 1952, Linz, Austria
Marital status:	Married (August 27, 1977, to Mag. Dr. Brigitte Almhofer)
Children:	Daughters Katharina, Elisabeth, and Anna
Citizenship:	Austrian

Education

"Diploma" degree from Technical University of Graz, 1975.

Master degree from Northwestern University, Evanston, Illinois, USA, 1975.

Ph. D. degree from Technical University of Graz, 1978 (Advisor: Prof. F. Kappel).

Habilitation at Technical University of Graz, 1980.

Professional Appointments

Long Term

September 1976–March 1986:	Assistant at Institute of Mathematics, Technical University of Graz, Austria.
March 1986–October 1993:	Professor of Mathematics at the Technical University of Graz, Austria.
November 1993–October 1996:	Professor of Mathematics (C4) at Technical University Berlin.
November 1996–present:	Professor of Mathematics at University of Graz, Austria. Since October 1, 2020 as emeritus.
January 2013–July 2016 and August 2018–March 2022:	Deputy Director of Radon Institute of the Austrian Academy of Sciences, Linz, Austria
August 2016–July 2018:	Managing Director of Radon Institute
April 2022–present:	Scientific Director of Radon Institute.

Short Term

September 1979–July 1980:	Visiting Assistant Professor, Lefschetz Center for Dynamical Systems, Division of Applied Mathematics, Brown University, Providence, RI, USA.
Academic years 1978/79 and 1981/82:	Joint appointment at the University of Graz, Austria.
September 1982–June 1983:	Visiting Associate Professor at Brown University, RI, and at the University of Oklahoma, Norman, OK, USA.
January 1985–July 1985:	Visiting Associate Professor, Lefschetz Center for Dynamical Systems, Division of Applied Mathematics, Brown University, Providence, RI, USA.
March 1985–February 1987:	Consultant at the Institute for Computer Applications in Science and Engineering at NASA Langley, Virginia, USA, (part-time).
February 1989–July 1989:	Visiting Professor, Division of Applied Mathemaics, Brown University, Providence, RI, USA.
September 1991– March 1992:	Visiting Professor at Institute de Recherche en Informatique et en Automatique (INRIA), Rocquencourt, France.
January 1994:	Visiting Professor at Paris IX (Université de Paris–Dauphine).
March 1994:	Visiting Professor at Institute de Recherche en Informatique et en Automatique (INRIA), Rocquencourt, France.

Offers

1985:	C3-Professorship at University of Erlangen, Germany.
1992:	C4-Professorship at TU-Berlin, accepted. Chair at University of Veterinary Medicine, Vienna.
1996:	Chair at the University of Graz, accepted.
1998:	C4-Professorship at University of Munich.
2003:	C4-Professorship at the University of Stuttgart.
2012:	Offer of the directorship at Johann Radon Institute for Computational and Applied Mathematics, Austrian Academy of Sciences, Linz.
2014:	Offer of the directorship of the Center for Computational and Data-Intensive Science and Engineering at Skoltech, Moscow.

Academic Honors and Awards

Pro Scienta-Scholarship 1974–1977.

Research Award of Theodor-Körner-Fonds, Vienna, April 1979.

Fulbright Travel Scholarship in academic years 1979/80, 1985.

Max Kade Scholarship 1982/83.

Fellowship of the Japanese Society for the Promotion of Science, March 1990.

Award of *Christian Doppler Laboratory*, April 1992.

Member of Senate of Christian Doppler Forschungsgesellschaft, since February 2002.

Vice Chairman of Scientific Advisory Board of Weierstrass Institute for Applied Analysis and Stochastics, 2005 – 2012.

Leader of Research Groups “Optimization and Control” at Radon Institute, Austrian Academy of Sciences, since January 2004.

SIAM Outstanding Paper Prize, 2006.

Lipschitz lecturer at Hausdorff Institute of Mathematics, Bonn, 2007.

Alwin Walther Medaille, Darmstadt, 2008.

Invited Lecture, International Congress of Mathematics, Hyderabad - India, 2010.

Member of the MATHEON Scientific Advisory Board, since 2015–2018.

SIAM Fellow, 2017.

Member of Scientific Advisory Board of Center for Mathematics and Artificial Intelligence (CMAI), George Mason University, USA, 2020–.

W.T. and Idalia Reid Prize 2021.

Scientific Evaluation of the Department of Mathematics at TU-Darmstadt, head of evaluation committee, February 2022.

Evaluation board member for numerous DFG programs in Germany, INRIA programs in France and EU projects.

Service to Profession

Editorial Board

1. European Journal of Mathematics (since 2015)
2. SIAM Journal on Control and Optimization (June 1983–May 1993, January 2005–) since January 2011 also corresponding editor
3. ESAIM: Mathematical Modelling and Numerical Analysis (2006–2012)
4. SIAM Journal on Numerical Analysis (since March 2007)
5. Computing (2003-2009), Computing & Visualization in Science (since 2009)
6. ESAIM: Control, Optimization and the Calculus of Variations (1995–2003, 2009–2012)
7. Inverse Problems (1990-1996)

8. Matematica Aplicada e Computacional (1988–2014)
9. Journal on Mathematical Systems, Estimation, and Control (October 1990–1998)
10. Journal of Applied Mathematics (since January 2003)
11. Walter de Gruyter: Radon Series for Computational and Applied Mathematics (since 2006)
12. Acta Applicandae Mathematicae (since 2010)
13. Vietnam Journal of Mathematics (since 2011)
14. Eurasian Journal of Mathematical and Computer Applications (since 2013)
15. Springer: Calcolo (since 2013)
16. Journal of the European Mathematical Society (since 2014)
17. Springer: PNLDE Subseries in Control (since 2016)
18. Optimization Methods and Software (since 2019)
19. Computational & Applied Mathematics (2016 - 2020)

Research Funds

"Dynamical Systems", February 1982–February 1984, funded by Austrian Science Foundation.

"Control Theory for Infinite Dimensional Systems", April 1984–June 1989, funded by Austrian Science Foundation.

"Parameter Estimation and Boundary Control", July 1986–December 1989, funded by US–Austrian Cooperative Science Program.

"Regularisation Methods for Nonlinear Problems", July 1990–July 1992, funded by Austrian Science Foundation.

"Estimation and Control for Infinite Dimensional Systems", November 1989–November 1991, US–Austrian Cooperative Science Program.

"Mathematical Optimization and Inverse Problems", by Ministry of Science and Technology, April 1, 1991–March 31, 1994.

Christian Doppler Research Laboratory, 1992–1998.

"Control of Partial Differential Equations and Applications", Human Capital and Mobility Project, funded by European Community, October 1, 1994–September 30, 1997.

"Optimal Control of the Equations of Fluid Flow", University Special Research Program (Universitärer Forschungsschwerpunkt 8), Project T4, funded by Technical University Berlin, April 1, 1995–December 31, 1997.

"Parameter Estimation in Variational Inequalities", funded by **SFB** F 003,"Optimization and Control", August 1, 1997–July 31, 2004.

"Suboptimal Control for Nonlinear Problems with Emphasis on Fluids", funded by **SFB** F 003,"Optimization and Control", August 1, 1997–July 31, 2004.

"Augmented Lagrange-SQP Methods for the Control of Fluid Flow" funded by European Commission (TMR Marie Curie Research Training Grant) October 15, 1998–October 14, 1999.

"Variational Methods in Medical Imaging", by Ministry of Science and Technology, February 1, 2000–January 31, 2001.

"Variational Methods in Application to Crack Problems" funded by FWF (Lise Meitner-Programm), March 1, 2002 - March 1, 2004.

Aktion-Program: Fictitious Domain Methods and Shape Optimization for Free Boundary Value Problems, with Prof. Haslinger, Karls-Universität Prag, 2001–2002 and 2003–2004.

Amadee-Program: New Numerical Methods for Free Boundary and Shape Optimization Problems, with Prof. Touzani, Université Clemont-Ferrand, 2004.

SFB *"Mathematical Optimization and Applications in Biomedical Sciences",* ***Speaker****. 2007–2019*

Doctorial College: "Numerical Simulations in Technical Sciences", Projectleader, 2007–2009.

Zukunftsfonds des Landes Steiermark: Neue Optimierungsmethoden in der Strukturmechanik, 2007–2008.

"Optimal Control of Stefan Problems with Constraints", with R. Herzog (Griesse), August 2006–August 2010, funded by Austrian Science Foundation.

European Science Foundation Research Network Project: "Optimization with PDE Constraints": October 2008–September 2012.

European Community FP7 Project: "Personal Glucose Predictive Diabetes Advisor", Academic Partner in the Austrian Knot, 2008–2012.

International Research Training Group (jointly with TU-Munich): "Optimization and Numerical Analysis for Partial Differential Equations with Nonsmooth Structures", funded by Austrian Science Foundation, **Co-speaker**, 2012–2021.

European Community Horizon 2020 **ERC Advanced Grant**: "From Open to Closed Loop Optimal Control of PDEs", European Research Council, 2016–2021.

Thesis Advisor

The following Ph. D. theses were completed under my guidance:

Numerische Approximation des linear quadratischen Optimierungsproblems bei parabolischen Differentialgleichungen (D. I. M. Kroller).

Parameterschätzung in einem Reaktions–Diffusionsmodell mit Rückführung über den Rand (D. I. H. Schelch, now departement chief at AVL-Graz).

Structural Operators for Abstract Functional Differential Equations (Mag. M. Mastinsek, now Prof. at Univ. Marburg).

Identification of an Interface Using Harmonic Analysis Techniques and Regularization Methods (Mag. W. Ring).

Parameterschätzung in eindimensionalen Modellen für instationäre Strömungen in Dieseleinspritzsystemen (Dipl.-Ing. W. Egartner).

Mesh-Independence of an Augmented Lagrangian-SQP Method in Hilbert Spaces and Control Problems for the Burgers Equation (Dipl.-Math. S. Volkwein, now Professor at Univ. Konstanz).

Domain Optimization for the Stationary Stokes and Navier-Stokes Equations by an Embedding Domain Technique (Dipl.-Math. T. Slawig, now Prof. at Univ. of Kiel)

Optimal Control of the Solid Fuel Ignition Model (Dipl.-Math. A. Kauffmann)

Constrained Optimal Control of Stationary Viscous Incompressible Fluids by Primal–Dual Active Set Methods (Dipl.-Math. J. C. de los Reyes, now Prof. at Univ. Quito).

Sequential quadratic programming methods for optimal control of nonlinear hyperbolic equations (Dipl.-Math. Josef Stephane Ambani)

Infinite-dimensional semi-smooth Newton and augmented Lagrangian methods for contact and friction problems in elasticity (Dipl.-Math. Georg Stadler, now assistant Prof. at Univ. of Austin, Texas)

Semi-smooth Newton methods for time optimal control of nonautonomous ordinary differential equations (Mag. Jelena Rubesa)

Optimal shape design using translation invariant cost functionals in fluid dynamics (Dipl.-Ing. Henry Kasumba)

Uniform convergence of the POD method and applications to optimal control (Dipl.-Ing. Markus Müller)

Optimal Receding Horizon Control of the Wave Equation with help of Trigonometric Operators and SEM Methods (Dipl.-Ing. Stefan Reiterer)

Higher Order Regularization for Model Based Data Decompression (Mag. Martin Holler)

Semismooth Newton Method for variational inequalities with gradient constraint (Dipl.-Ing. Serbiniyaz Anyyeva)

Sparse measure-valued optimal control problems governed by wave equations (Dipl.-Math. Philip Trautmann)

On the Stabilizability of Infinite Dimensional Systems via Receding Horizon Control (MSc Behzad Azmi)

Optimal Control and Bayesian Inversion for Linear Second-Order Hyperbolic Equations by BV-Functions in Time (MSc.Sebastian Engel)

Learning Regularization Operators (MSc. Gernot Holler)

The following habilitations were completed under my guidance:

Optimal and instantaneous control of instationary Navier–Stokes equations (Dr. M. Hinze, now Prof. at Univ. of Hamburg).

Optimal and suboptimal control of partial differential equations: Augmented Lagrange–SQP methods and reduced–order modelling with proper orthogonal decomposition (Dr. St. Volkwein, now Prof. at Univ. of Konstanz).

Optimization problems in function spaces (Dr. M. Hintermüller, now Professor at Humbold University).

Analysis and numerical methods for geometrical variational problems (Mag. Dr. W. Ring).

Multigridverfahren für Optimalitätssysteme (Mag. Dr. Alfio Borzi, now Professor at Univ. of Würzburg).

Regularization formulations and numerical solutions for image processing (Mag. Dr. Stephen Keeling).

Stability and sensitivity analysis in optimal control of partial differential equations (Dipl. Math. Dr. R. Herzog (Griesse), now Professor in Chemnitz).

Efficient numerical solutions of optimization problems governed by partial differential equations (Dipl. Math. Dr. B. Vexler, now Professor at TU Munich).

Numerical solution of optimal control and inverse problems in non-reflexive Banach spaces (Dipl. Math. Dr. Christian Clason, now Professor at KFU Graz).

Feedback control of nonlinear infinite-dimensional control systems (Dipl. Math. Dr. Tobias Breiten, now Professor at TU Berlin)

Feedback exponential stabilizability of nonautonomous parabolic-like systems (Dr. Sergio S. Rodrigues)

Short Term Visits

Lefschetz Center for Dynamical Systems, Brown University, USA (April 1981, September 1984, Oktober 1985, February 1986, December 1986, August 1987, August 1988, Dezember 1988).

University of Rome (October 1981, January 1982, January 1988 and January 2006).

NASA-Research Center, ICASE, Hampton, Virginia, USA (June 1983).

University of Bari (April 1983).

Institut National de Recherche en Informatique et en Automatique (INRIA), Paris (October 1984, December 1990, November 1994, February 1995).

Advisor at “Institut for Computer Applications in Science and Engineering”, NASA, Langley Research Center, Virginia, USA (March 1985, March 1987).

University of Augsburg, Schwerpunktprogramm “Anwendungsbezogene Optimierung and Steuerung” (September 1989).

Center for Applied Mathematical Sciences an der University of Southern California, Los Angeles (February 1990, November 1990, July 1991).

University of Trier (September 1990).

University of Jyväskylä, Finland (November 1991).

North Carolina State University (April/September 1993, February 1994, April/May 1996).

Visiting Professor Université Paris-Dauphine (March 1994).

Université d’Orléans (September/October 1995).

Visiting Professor Université Paris-Dauphine (February 1997).

University of Cantabria (September 1997).

Visiting Professor Université Paris-Dauphine (May 1998, April 2000).

North Carolina State University (at least once per year since 1997).

Escuela Politecnica Nacional Quito, Ecuador, (January 2007).

et alt.

Invited Lectures and Contributed Papers

($\bullet \cdots$ invited lecture, $* \cdots$ contributed paper)

* 9. Österreichischer Mathematiker-Kongreß (Sep. 1977).
- Summer School and Conference on Functional Differential Equations and Approximation of Fixed Points, Bonn (July 1978).
- Conference in Oberwolfach on "Gewöhnliche Differentialgleichungen" (April 1979).
- Workshop on Functional Differential Equations and Nonlinear Semigroups, Retzhof (May 1979).
* Annual Meeting of the Canadian Mathematical Society, Toronto (July 1979).
- Conference on Nonlinear Phenomena in the Mathematical Sciences, Texas (June 1980).
- Banach Center Semester on Mathematical Control Theory, Warschau (October 1980).
* Rutishauser Symposium on Numerical Analysis, Zürich (October 1980).
- Workshop on Control and Identification of Distributed Parameter Systems, ICASE (NASA Research Center), Hampton, Virginia, USA (April 1981).
* Equadiff, International Conference on Differential Equations, Bratislava (August 1981).
* 10. Österreichischer Mathematikerkongreß, Innsbruck (September 1981).
- Conference in Oberwolfach on "Regelungstheorie" (March 1982).
- Conference in Oberwolfach on "Approximation von Differenzen– Differentialgleichungen" (June 1982).
* 3. IFAC Symposium "Control of Distributed Parameter Systems", Toulouse (July 1982).
* 89-th Annual Meeting of the American Mathematical Society, Denver (January 1983).
- 802-nd Meeting of the American Mathematical Society, Norman, Oklahoma (March 1983).
- SIAM–National Meeting, Denver (May 1983).
* 3. Österreichisches Mathematikertreffen (September 1983).
- Conference in Oberwolfach on "Regelungstheorie" (March 1984).
- Workshop on Control and Identification of Distributed Parameter Systems, ICASE (NASA Research Center), Hampton, VA, USA (June 1985).
- SIAM Spring Meeting, Pittsburgh, USA (June 1985).
* 11. Österreichischer Mathematikerkongreß, Graz (September 1985).
- International Symposion on Variational Methods in the Geophysical Sciences, Norman, OK (October 1985).
- International Institute for Applied System Analysis (IIASA), Laxenburg (December 1985).

- IFIP-TC7 Conference on Control Problems Described by Partial Differential Equations and Applications, Gainesville, USA (February 1986).
- Fourth French-German Conference on Optimization, Irsee (April 1986).
- Conference in Oberwolfach on “Inverse Problems” (May 1986).
- Conference on “Ill-posed and Inverse Problems”, St. Gilgen (June 1986).
- Fourth IFAC-Symposium on Control of Distributed Parameter Systems, plenary Lecture, Pasadena, CA. (June 1986).
- From Data to Model: Lecture Week at International Institute for Applied Systems Analysis, Laxenburg (September 1986).
- Special Week on Control Theory (within: Half Year Program on Evolution Equations), Pisa, Italien (February 1987).
- Workshop on Application and Algorithms for Optimal Control and Parameter Identification, Trier (June 1987).
- Summerschool on “Angewandte Mathematik”, Frauenberg, Österreich (September 1987).
- Workshop on Illposed and Inverse Problems, FU Berlin (October 1987).
- 26-th IEEE Conference on Decision and Control, Los Angeles (December 1987), plenary lecture.
- Workshop on Computational Aspects of Identification and Control of Distributed Parameter Systems, Providence, USA (August 1988).
- Summer School: Perspectives in Control Theory, Warsaw (September 1988), plenary Lecture.
- International Conference on Numerical Methods in Optimization and Optimal Control, Trier (June 1989).
- 5-th IFAC Symposium of Control of Distributed Parameter Systems, Perpignan (June 1989).
- Modelling and Inverse Problems of Control for Distributed Parameter Systems, IIASA, Laxenburg (August 1989).
- Inverse Problems, Multicentennial Meeting, Montpellier (December 1989).
- Nonlinear Phenomena, Montpellier (December 1990).
- Inverse Problems, Computational Algorithms, College Station, Texas (February 1991).
- Optimization Methods in Differential Equations and Control, North Carolina State University (July 1991).
- Problèmes Inverses, Montpellier (December 1991).
- AMS/IMS/SIAM Summer Conference on Control and Identification on Partial Differential Equations, Mount Holyoke, Mass. (July 1992).
- Fourth Colloquium on Inverse Problems, Chemnitz (September 1992).

- Österreichisch–Slowenisches Mathematikertreffen, Graz (October 1992).
- Parameter Estimation and Control in Deterministic and Stochastic Systems, Merseburg (October 1992).
- Kolloquium des SFB 319 der DFG, Gosslar (October 1992).
- Control Theory and Its Applications, Institute for Mathematics and Its Applications, Minnesota (November 1992).
- Optimal Control of Partial Differential Equations, Oberwolfach (January 1993).
- Conferentie van Numerick Wiskundigen, Woudschoten, The Netherlands (September 1993).
- GAMM-SIAM Conference on Inverse Problems in Diffusion Processes, St. Wolfgang, Austria (June 1994).
- International Conference on Operations Research OR '94, Berlin (August 1994).
- IFIP-TC7 (WG 7.2)–Conference on Control of Partial Differential Equations and Applications, Laredo, Spain (September 1994).
- Symposium on Inverse Problems, Chemnitz (March 1995).
- Workshop on Parameter Identification and Inverse Problems in Hydrology, Geology and Ecology, Karlsruhe (April 1995).
- Third SIAM Conference on Control and Its Applications, St. Louis (April 1995).
- ICIAM 95, The Third International Congress on Industrial and Applied Mathematics, Hamburg (July 1995).
- Inverse Problems in Medical Imaging and Nondestructive Testing, Oberwolfach (February 1996).
- AMS-IMS-SIAM Joint Summer Research Conferences in the Mathematical Sciences: Conference on Optimization methods in partial differential equations, Mount Holyoke College, South Hadley, MA, USA (June 1996).
- 8th French-German Conference on Optimization, Trier (July 1996).
- Euroconference Advanced Mathematical Tools in Metrology III, Berlin (September 1996).
- GAMM Conference, Regensburg (March 1997).
- Control of Distributed Parameter Systems, Luminy–Marsailles (August 1997)
- Control Theory and Applications, Institute Henri Poincaré, Paris (March 1998).
- Workshop on Nonlinear Robust and Optimal Control, Würzburg (March 1998).
- Conference on Inverse Problems, Control and Shape Optimization, Tunis (April 1998).
- Conference on Optimal Control and Partial Differential Equations, Chemnitz (April 1998).
- Partial Differential Equations, Theory and Numerical Solutions, Prag (August 1998).
- Ill–Posed Variational Problems and Regularization Techniques, Trier (September 1998).

- Colloquium on Applied Mathematics in Austria, Wien (October 1998).
- Workshop on Adaptive Finite Element Methods and Optimization, Heidelberg (November 1998).
- Control of Systems Governed by Partial Differential Equations, Nancy (March 1999).
- International Conference on Optimization, Trier (March 1999).
- French–Russian Conference on Seismic Waves in Heterogenous Media, Moscow (May 1999).
- Shortcourse on Numerical Methods for Fluid Flow, Toulouse (June 1999). (3 tutorial lectures).
- ERCOFTAC workshop, Toulouse (June 1999).
- Workshop on Receding Horizon Control, Rodulc (November 1999).
- Fast solutions of Discretized Optimization Problems, Weierstrass Institute, Berlin (May 2000).
- Optimal control of complex dynamical structures, Oberwolfach (June 2000).
- Inverse Problems: Strobl, Austria (June 2000).
- Numerical Modelling in Continuum Mechanics: Prag, (August 2000)
- Conference on Future Directions in Distributed Parameter Systems: Raleigh, USA (October 2000)
- International Meeting on the Control and Stabilization of Partial Differential Equations: Cortona, Italien (Mai 2001)
- Meeting on Numerical Methods for Non Linear Problems in Optimization and Control: Cortona, Italien (Juni 2001), Short Course.
- GAMM Special Meeting on Multigrid Methods for Optimal Control of Partial Differential Equations: Max Planck Institut, Leipzig (January 2002)
- GAMM Jahrestagung, Augsburg (März 2002), plenary lecture.
- 2nd Conference on Inverse Problems, Control and Shape Optimization, Karthago, Tunesien (April 2002).
- 34ème Congres national d'analyse numerique, Pau (May 2002), plenary lecture.
- Mathematical Theory of Networks and Systems, South Bend, Indiana, USA (August 2002).
- Special Semester on Inverse Problems, Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, USA (September 2002), plenary lecture.
- Workshop on Optimization in Partial Equations and Applications, Heidelberg (October 2002), plenary lecture.
- Numerical Techniques for Optimization Problems with PDE Constraints, Oberwolfach (February 2003).

- Workshop on Numerical and Symbolic Scientific Computing, Strobl, Austria (June 2003).
- Workshop: Control of PDEs, TU Berlin (December 2003).
- Workshop on Numerik für instationäre Kontrollprobleme, Oberwolfach (January 2004).
- GAMM Annual Meeting, Dresden, Germany (March 2004).
- EUCCO 2004, Dresden, Germany (March 2004).
- INRIA-Rocquencourt Conference on New Trends in Mathematical and Numerical Methods for Geosciences, Direct and Inverse Problems, Paris, France (December 2004), plenary lecture.
- SIAM Conference on Computational Science and Engineering, Orlando, USA (February 2005).
- Conference in Oberwolfach on "Optimal Control of Coupled Systems of PDEs" (April 2005).
- 8th SIAM Optimization Conference, Stockholm, Sweden (May 2005).
- 6th SIAM Conference on Control and its Applications, New Orleans, USA (July 2005), Short Course.
- ENUMATH 2005, 6th European Conference on Numerical Mathematics and Advanced Applications, Santiago de Compostela, Spain (July 2005), plenary lecture.
- Workshop on PDE Constrained Optimization, Tomar, Portugal (July 2005), plenary lecture.
- Short Course: Model reduction based on proper orthogonal decomposition, Rome (January 2006).
- Conference in Oberwolfach on "Numerical Methods for PDE-Constrained Optimal Control" (February 2006).
- Workshop on Model Reduction, Rice University, Houston, USA (May 2006).
- CIMPA Course on PDE-Constrained Optimal Control, Castro Urdiales (September 2006).
- DMV Meeting, Bonn (September 2006).
- Active Flow Control, Berlin (September 2006), plenary lecture.
- DFG Workshop, Linz (March 2007).
- SAMSI Opening Workshop on Random Media, North Carolina/USA (September 2007).
- Symposium in the honour of Prof. K.-H. Hoffmann, Munich (October 2007).
- Lipschitz Lecturer at the Hausdorff Institute of Mathematics, Bonn (November-December 2007).
- Conference in Oberwolfach on Optimal Control of Coupled Systems of PDE (March 2008).
- Workshop on PDE Constrained Optimization - Recent Challenges and Future Developments, Hamburg (March 2008).

- Workshop on Industrial Applications of Low Order Models Based on POD, Bordeaux (March 2008).
- Conference on 50 Years of Optimal Control, Poznan (September 2008).
- Workshop on Phase Transitions and Optimal Control, Weierstrass Institute for Applied Analysis and Stochastics (WIAS), Berlin (October 2008).
- Conference on Statistical Regularization and Qualitative Constraints, Göttingen (November 2008).
- Workshop on Optimization with PDE Constraints “OPTPDE 2008”, Warsaw (December 2008).
- Conference on Numerical Methods for PDE-Constrained Optimal Control, Oberwolfach (February 2009).
- Workshop on Coherence, Control and Dissipation, Minneapolis (February/March 2009).
- Conference in Applied Mathematics “SMAI 2009”, La Colle sur Loup (May 2009).
- Conference in Glasgow, 23rd Biennial Numerical Analysis (June 2009), plenary lecture.
- SIAM Conference on Control and Its Applications, Denver (July 2009), plenary lecture.
- 12th Workshop on Well Posedness of Optimization Problems in Trento, Italy (September 2009).
- 14th Belgian-French-German Conference on Optimization (BFG09) in Leuven, Belgium (September 2009).
- DMV-Tagung, Munich (March 2010).
- International Workshop on Inverse Problems, Hong Kong/Wuhan (April 2010).
- ICM-Hyderabad, invited semi-plenary lecture (August 2010).
- WIAS Workshop on Model Order Reduction in Optimization and Control with PDEs, Berlin (January 2011).
- Numerical Methods for Optimal Control and Inverse Problems Workshop, Munich (March 2011).
- GAMM 2011, Graz (April 2011).
- SIAM Conference on Optimization, Darmstadt (May 2011).
- Variational Image Analysis: Challenges and Perspectives Symposium, Heidelberg (July 2011).
- Workshop on Optimal Control of Partial Differential Equations, Klaffenbach (November 2011).
- Latin American Workshop on Optimization and Control III, Valparaiso, Chile (January 2012).
- 5th International Conference on High Performance Scientific Computing, Hanoi (March 2012).

- ESI Workshop on Computational Inverse Problems, Vienna (April 2012).
- 12th Viennese Workshop on Optimalcontrol, Dynamic Games and Nonlinear Dynamics, Vienna (June 2012).
- Workshop on Modeling, Optimization and Simulation of Complex Fluid Flow, Darmstadt (June 2012).
- International Conference on Applied and Computational Mathematics, Turkey (October 2012).
- Conference on Numerical Methods for PDE-Constrained Optimization with Uncertain Data, Oberwolfach (January 2013).
- Workshop on Optimal control of PDE, Erlangen (June 2013).
- Colloquium RICAM 10, Linz (March 2013).
- IFIP TC7, Klagenfurt (September 2013).
- IFAC CPDE, Paris (September 2013).
- SKOLTECH, Moskau (Juni 2014).
- CEDYA XIV Cádiz, Spain (June 2015).
- European Control Conference, Linz (July 2015).
- CIRM Luminy, Marseille (November 2015).
- OCDE Workshop INRIA Saclay, Paris (November 2015).
- MORCIP Lausanne (May 2016).
- OCERTO Cortona (June 2016).
- ECMath Guest Colloquium Berlin (January 2017).
- Quantum Control Theory Workshop, Munich (April 2017)
- Workshop on Numerical Methods for Optimal Control and Inverse Problems (OCIP2017), Munich (April 2017)
- NUMOC Workshop, Rom (June 2017)
- Workshop "Optimal Control of Partial Differential Equations" on the occasion of Eduardo Casas' 60th Birthday, Cantabria (September 2017)
- 18th French-German-Italian Conference on Optimization (FGI 2017), Paderborn (September 2017)
- Woudschoten Conference, Woudschoten (October 2017)
- Workshop "Challenges in Optimal Control of Nonlinear PDE-Systems", Oberwolfach (April 2018)
- 28th IFIP TC7 Conference on System Modeling and Optimization, Essen (July 2018)
- Festkoloquium zu Ehren von Martin Brokate, Munich (November 2018)

- Workshop "PDE-Constrained Optimization, Optimal Controls and Applications", Sanya (December 2018)
- ESI Workshop "Modern Maximal Monotone Operator Theory: From Nonsmooth Optimization to Differential Inclusions", Wien (February 2019)
- Conference "Control and Stabilization issues for PDE", Toulouse (September 2019)

  et alt. in 2020, 2021, 2022.

Lectures science to public

- "Optimierung und Numerische Simulation in der Medizintechnik", Alpbacher Universitätenforum: Computational Science and Engeneering, Alpbach, 2009.
- "Erfolge der Mathematik bei der Verbindung von Grundlagen- und angewandter Forschung", ÖFG Workshop: Wissenstransfer - geteilte Aufgaben von Universität und Gesellschaft, Baden bei Wien, 2012.

Lectures at European Universities

Augsburg	Freiburg	Paris (Institute Henri Poincare)
Bari	Göttingen	Paris-Dauphine, Short Course
Bergen	Hamburg	Pisa
Berlin (TU)	Hannover	Rom
Berlin (Humboldt)	Heidelberg	Saarbrücken
Bochum	Kaiserslautern	Santander
Bonn	Konstanz	Stuttgart
Chemnitz	Leoben	Trier
Clermont Ferrand	Linz	Wien
Darmstadt	München (TU u. Univ.)	Würzburg
Dresden	Münster	Zürich (ETH u Univ.)
Erlangen	Oxford	
Essen	Paris (INRIA)	

Lectures at American Universities

University of Florida
University of Southern California
Vanderbilt University
Tulane University
Brown University
Mathematical Research Center,
University of Wisconsin
University of Montreal
Pomona Colleges
North Carolina State University
Southern Methodist University
University of Texas at Arlington
Memphis State University
Pennsylvania State University
Southern Illinois University
Virginia Polytechnic Institute and
State University
Worchester Polytechnic Institute
Claremont Graduate School

Lectures at Japanese Universities

Osaka, Kobe, Kyoto, Tokushima, Naruto

Organization of Meetings

Conference-Workshop on Control Theory for Distributed Parameter Systems, Vorau, Österreich, 11.7.–17.7.1982 (with Prof. Kappel and Prof. Schappacher).

Second International Conference on Control Theory for Distributed Parameter Systems and Applications, Vorau, Österreich, 9.7.–14.7.1984 (with Prof. Kappel and Prof. Schappacher).

International Symposium on Variational Methods in the Geophysical Sciences, Norman, OK, USA, October 1985 (Organizing Committee).

IFAC-4th International Symposium on Control of Distributed Parameter Systems, Pasadena, CA, USA, June 1986 (Organizing Committee).

International Conference on Control and Identification of Distributed Systems, 6.7.–12.7.1986, Vorau, Österreich (with Prof. Kappel and Prof. Schappacher).

International Conference on Control and Identification of Distributed Parameter Systems, Vorau, Österreich, 10.7. - 16.7.1988 (with Prof. Kappel and Prof. Schappacher).

5-th IFAC Symposium on Control of Distributed Parameter Systems, Perpignan, Frankreich, June 1989 (Organizing Committee).

Modelling and Inverse Problems of Control for Distributed Parameter Systems, IASA, Laxenburg, 24.8.–28.8.1989 (Organizing Committee).

International Conference on Control and Identification of Distributed Parameter Systems, 9.7.–14.7.1990 (with Prof. Kappel and Doz. Desch).

International Conference on Control and Identification of Distributed Parameter Systems: Nonlinear Phenomena, Vorau, Österreich, 18.7.–24.7.1993 (with Prof. Kappel and Doz. Desch).

Third International Congress on Industrial and Applied Mathematics, ICIAM 95, Hamburg, Germany, 3.7.–7.7.1995, Minisymposium on Domain Optimization (with Prof. Sokolowski).

International Conference on Control and Estimation of Distributed Parameter Systems, Vorau, Austria, 14.7.–20.7.1996 (with Prof. Kappel und Doz. Desch).

SIAM-GAMM Conference Series on Inverse Problems (Organizing Committee).

Workshop on Image Processing, Graz, Austria, May 1999.

Workshop on Proper Orthogonal Decomposition and its Applications, Graz, Austria, May 2000.

International Conference on Optimal Control of Complex Dynamical Systems, Oberwolfach, Germany, June 2000.

8-th Conference on Control of Distributed Parameter Systems, Graz–Mariatrost, Österreich, 15.7.–21.7.2001 (with Prof. Desch and Prof. Kappel).

Workshop on Advances in Numerical Algorithms, Graz, Austria, September 2003.

International Workshop on “Numerik für instationäre Kontrollprobleme”, Oberwolfach, Germany, January 2004.

International Conference on Optimal Control of Coupled Systems of PDE, Oberwolfach, Germany, April 2005.

International Conference on Numerical Techniques for Optimization Problems with PDE Constraints, Oberwolfach, Germany, February/March 2006.

International Mini-Workshop on Control of Free Boundaries, Oberwolfach, Germany, February 2007.

ENUMATH 07, Graz, September 2007.

International Conference on Optimal Control of Coupled Systems of PDE, Oberwolfach, Germany, March 2008.

IMA-Workshop: Coherence, Control and Dissipation, Minneapolis, March 2009.

BIDOMAIN-Workshop: Graz-Mariatrost, Austria, October 2009.

International Workshop on Control and Optimization of Partial Differential Equations, Mariatrost, Austria, November 2011.

International Workshop on From Open to Closed Loop Control, Mariatrost, Austria, June 2015.

International Workshop on Optimal Control of Dynamical Systems, Mariatrost, Austria, May 2017.

4th Workshop on Model Reduction of Complex Dynamical Systems - MODRED 2019, Graz, Austria, August 2019

Courses Taught

The courses were taught at the Technical University of Graz, Technical University Berlin, Brown University, University of Oklahoma, and University of Graz.

WS	1978/79	Integral Equations
SS	1979	Biostatistics
WS	1979/80	Linear Operators I
SS	1980	Linear Operators II
WS	1980/81	Integral Equations
SS	1981	Ordinary Differential Equations II
WS	1981/82	Calculus of Variations
SS	1982	Seminar on Control Theory for Partial Differential Equations
WS	1982/83	Foundations of Analysis I
SS	1983	Foundations of Analysis II
WS	1983/84	Optimal Processes
SS	1984	Control Theory
WS	1984/85	Differential Equations II
SS	1985	Ordinary Differential Equations
SS	1986	Analysis 4
WS	1986/87	Measure and Integration Theory
SS	1987	Mathematical Optimization
WS	1987/88	Measure and Integration Theory
SS	1988	Lineare Algebra 2
		Selected Topics in Numerical Mathematics
WS	1989/90	Functional Analysis,
		Special Topics in Numerical Analysis
SS	1990	Mathematical Optimization
WS	1990/91	Partial Differential Equations,
		Special Topics in Numerical Analysis
SS	1991	Ordinary Differential Equations
SS	1992	Ordinary Differential Equations
WS	1992/93	Functionalanalysis
SS	1993	Ordinary Differential Equations,
		Special Topics in Numerical Analysis
WS	1993/94	Inverse Problems II
SS	1994	Numerical Mathematics I
WS	1994/95	Numerical Mathematics II
SS	1995	Optimization I
WS	1995/96	Optimization II
WS	1996/97	Linear Algebra
SS	1997	Analytical Geometry
WS	1997/98	Numerical Mathematics I
SS	1998	Numerical Mathematics II
WS	1998/99	Linear Algebra
SS	1999	Analytical Geometry

WS	1999/00	Numerical Mathematics I
SS	2000	Numerical Mathematics II
SS	2001	Funktionalanalysis
WS	2001/02	Lineare Algebra I
SS	2002	Lineare Algebra II
WS	2002/03	Numerical Mathematics II
SS	2003	Gewöhnliche Differentialgleichungen und Funktionentheorie
WS	2003/04	Numerical Mathematics II
SS	2004	Numerical Mathematics I
WS	2004/05	Numerical Mathematics II
SS	2005	Complex Analysis and Ordinary Differential Equations
WS	2005/06	Partial Differential Equations
SS	2006	Numerical Analysis I
WS	2006/07	Numerical Analysis II,
		PDE-Constrained Optimization
SS	2007	Optimization I
WS	2007/08	Optimization II
SS	2008	Numerical Mathematics I
WS	2008/09	Optimization I
SS	2009	Introduction to Numerical Mathematics
		Optimal Control Theory
WS	2009/10	Introduction to Optimization I
SS	2010	Optimization II
WS	2010/11	Optimization I
SS	2011	Optimization II
WS	2011/12	Optimization I
SS	2012	Optimization II,
		Optimization and Control in Infinite Dimensions
WS	2012/13	Optimization I
SS	2013	Optimization II
WS	2013/14	Optimization in infinite dimensional spaces
SS	2014	Optimization II
WS	2014/15	Optimization II
SS	2015	Optimization in infinite dimensional spaces
WS	2015/16	Nonlinear Optimization
SS	2016	Algorithmic infinite dimensional optimization

no classroom teaching thereafter due to a succession of sabbaticals.

LIST OF PUBLICATIONS

Books

H. T. Banks and K. Kunisch. *Estimation Techniques for Distributed Parameter Systems*, Birkhäuser, Boston, 1989.

K. Ito and K. Kunisch. *On the Lagrange Multiplier Approach to Variational Problems and Applications*, SIAM, Philadelphia, 2008.

Articles in Refereed Publications

[1] K. Kunisch. Neutrale Funktional-Differentialgleichungen und Halbgruppentheorie. *Berichte der Math.-Stat. Sektion im Forschungszentrum Graz*, 81:101, 1978.

[2] K. Kunisch. Neutral functional differential equations in Lp-spaces and averaging approximations. *Nonlinear Analysis*, 3(4):419–447, 1979. doi:10.1016/0362-546X(79)90060-9.

[3] K. Kunisch. Abstract Cauchy problem and abstract integral equations for neutral functional differential equations. *Archiv der Mathematik*, 31(1):580–588, December 1978. doi:10.1007/BF01226495.

[4] K. Kunisch. Order preserving evolution operators of functional differential equations. *Boll. Un. Mat. Ital. B*, 16:480–500, 1979.

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[6] K. Kunisch and W. Schappacher. Variation of constants formulas for partial differential equations with delay. *Nonlinear Analysis*, 5(2):123–142, 1981. doi:10.1016/0362-546X(81)90038-9.

[7] F. Kappel and K. Kunisch. Spline approximations for neutral functional differential equations. *SIAM Journal on Numerical Analysis*, 18(6):1058, 1981. doi:10.1137/0718072.

[8] K. Kunisch and W. Schappacher. Mild and strong solutions for partial differential equations with delay. *Annali di Matematica Pura ed Applicata*, 125(1):193–219, December 1980. doi:10.1007/BF01789412.

[9] K. Kunisch. Approximation of optimal control problems for hereditary systems of neutral type. *Berichte der Math.-Stat. Sektion im Forschungszentrum Graz*, 137(65):22, 1980.

[10] K. Kunisch. The quasi autonomous Cauchy problem and the step method for functional differential equations. *Included in the Postdoctoral Thesis*, 1980.

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[12] K. Kunisch. Approximation schemes for the linear-quadratic optimal control problem associated with delay equations. *SIAM Journal on Control and Optimization*, 20(4):506, 1982. doi:10.1137/0320038.

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[16] K. Kunisch. Identification and estimation of parameters in abstract Cauchy problems. In *Mathematical Control Theory*, Banach Center Publications, pages 279–300. PWN, Warsaw, 1983.

[17] H. T. Banks and K. Kunisch. An approximation theory for nonlinear partial differential equations with applications to identification and control. *SIAM Journal on Control and Optimization*, 20(6):815, 1982. doi:10.1137/0320059.

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