

# curriculum vitae

## Dr Jens Wirth

Institute of Applied Analysis  
TU Bergakademie Freiberg  
09596 Freiberg, Germany  
Phone: +49 (0)3731 39 3393  
wirth@math.tu-freiberg.de

*Current Address:*  
Department of Mathematics  
Imperial College London  
180 Queen's Gate  
London, SW7 2AZ, UK  
jwirth@math.ucl.ac.uk

### Personal Data

*Date of Birth:* August 14, 1976  
*Place of Birth:* Burgstädt, Germany (GDR)  
*Marital Status:* unmarried  
*Nationality:* German  
*Address:* Kirchgasse 15  
09599 Freiberg  
Germany

89 Abbots Wharf  
93 Stainsby Road  
London E14 6JN  
UK

### Education

*TU Bergakademie Freiberg, Germany*

- Doctorate *Dr. rer. nat.* in Analysis (minor subject Algebra), 2005  
Grade: *summa cum laude*
- Diploma in Applied Mathematics (*Dipl.-Math.*), 2001
- Study of Applied Mathematics (Angewandte Mathematik) at the TU Bergakademie Freiberg, 1996 – 2001 with a foreign stay at the Rijksuniversiteit Gent, Belgium, in spring 1999

*Johannes-Kepler-Gymnasium Chemnitz*

- Abitur (school-leaving examination) with grade 1.0, 1995

### Professional Experience

*Imperial College London, 10/2007 – present*  
Research Associate

*University College London, 10/2006 – 9/2007*  
Teaching Fellow

*TU Bergakademie Freiberg, 4/2004 – 9/2006*  
wissenschaftlicher Mitarbeiter (scientific assistant)

## Research Experience

*Postdoctoral Research*, TU Bergakademie Freiberg, 2005 – 2006, University College London, 2006 – 2007, Imperial College London, 2007 – present

- Hyperbolic systems with time-dependent coefficients (with M. Ruzhansky, London)
- Influence of oscillations in coefficients of hyperbolic partial differential equations;
  - wave equations with time-periodic dissipation,
  - $C^m$ -theory for non-effectively damped wave equations with stabilising coefficients,
  - $C^m$ -theory for wave equations with increasing propagation speed  
(both with F. Hirosawa, Yamaguchi University)
- Investigation of models of anisotropic thermoelasticity.
- Abstract wave equations.

*Doctoral Research*, TU Bergakademie Freiberg, 2001 – 2005

from 8/2001–3/2004 financed by a grant of the state of Saxony (Landesgraduiertenstipendium)

- Explicit representations of solutions to weakly dissipative wave equations in terms of special functions.
- Asymptotic representations of solutions to wave equations with time-dependent dissipation and classification of dissipation terms.
- Proof of  $L^p$ – $L^q$  decay estimates in this time-dependent setting.
- Investigation of the diffusive structure.

*Undergraduate Research*, TU Bergakademie Freiberg, 2000 – 2001

- Diploma thesis on special classes of semilinear hyperbolic partial differential equations and the qualitative properties of their solutions.

## Teaching Experience

*Imperial College London*, 2007–present

*University College London*, 2006 – 2007

- *Teaching fellow*  
In this time I gave lectures on
  - Linear Algebra (for students of Economics, Statistics and related disciplines)

- Advanced Calculus and Geometry (for students of chemistry)

problem classes and tutorials.

*TU Bergakademie Freiberg, 2001 – 2006*

- *Doctoral student, 8/2001 – 3/2004, and scientific assistant, 4/2004–present*  
In this time I developed and graded problem sets and exams, held review sessions and on occasion substituted for the instructor in the following courses given by the faculty of the Institute of Applied Analysis
  - Analysis (for Mathematics students)
  - Initial- and Boundary Value Problems
  - Ordinary Differential Equations
  - Vector- and Tensoranalysis
  - Engineering Mathematics
- After graduating I taught (independently) the following lectures
  - Signal Theory
  - Special Functions
  - Functional Analysis
  - Seminar on Signal Theory and Applications to Image Processingand supervised a Bakkalaureus thesis on
  - The (discrete) Gabor Transform and their Implementation

### **Awards and Honours**

Within the recent years I received the following awards:

- Georgius Agricola Medal of the TU Bergakademie Freiberg and Georgius Agricola Price of the Michael Jürgen Leisler Kiep Foundation, 2002, awarded annually by the TU Bergakademie Freiberg
- First prize of the DMV-Studierendenkonferenz for the diploma thesis, 2001, awarded by the German Mathematical Society

### **Refereeing Activities**

In recent years I have reviewed manuscripts at the request of the editors or the following scientific journals:

- *Royal Society of Edinburgh, Proceedings A (Mathematics)*

- *Zeitschrift für Angewandte Analysis und ihre Anwendungen*
- *Discrete and Continuous Dynamical Systems, Series B*
- *Advances in Mathematical Sciences and Applications*

Furthermore, I am writing reviews for:

- *Mathematical Reviews (AMS)*

### **Society Memberships**

I am member in the following societies:

- International Society of Analysis, its Applications and Computation (ISAAC)
- Deutsche Mathematiker Vereinigung (DMV)
- Mathematik-Olympiaden e.V.

## Publications

### 1. Theses:

- (a) *Diploma thesis: About the solvability behaviour for special classes of nonlinear hyperbolic equations*, TU Bergakademie Freiberg, 2001  
Advisor: Prof M. Reissig  
Second Referee: Prof W. Sickel (Jena)
- (b) *Dissertation: Asymptotic properties of solutions to wave equations with time dependent dissipation*, TU Bergakademie Freiberg, 2005  
Advisor: Prof M. Reissig  
(Further) Referees: Prof R. Picard (Dresden)  
Prof V. Georgiev (Pisa)  
Prof K. Mochizuki (Tokio)

### 2. Refereed Journals:

- (a) J. Wirth, *About the solvability behaviour for special classes of nonlinear hyperbolic equations*, *Nonlinear Analysis* 52 (2003) 421–431
- (b) J. Wirth, *Solution representations for a wave equation with weak dissipation*, *Math. Meth. Appl. Sc.* 27/1 (2004) 101–124
- (c) J. Wirth, *Wave equations with time-dependent dissipation I. Non-effective dissipation*, *J. Differential Equations* 222/2 (2006) 487–514
- (d) J. Wirth, *Wave equations with time-dependent dissipation II. Effective dissipation*, *J. Differential Equations*, 232/1 (2007) 74–103
- (e) J. Wirth, *Scattering and modified scattering for abstract wave equations with time-dependent dissipation*, *Adv. Differential Equations* 12/10 (2007), 1115–1133  
Preprint, arXiv:math.AP/0606015

### 3. Refereed Proceedings:

- (a) M. Reissig, J. Wirth,  *$L^p$ – $L^q$  estimates for wave equations with monotone time-dependent dissipation*, in *Proceedings of the RIMS Symposium on Mathematical Models of Phenomena and Evolution Equations* (Naoki Yamada, ed.), RIMS Kôkyûroku 1475 (2006) 91–106
- (b) J. Wirth, *Scattering and modified scattering for abstract wave equations with time-dependent dissipation*, in *Proceedings of the 4th International Conference "Analytical Methods of Analysis and Differential Equations" (AMADE 2006)* (A A Kilbas, S V Rogosin ed.), Vol. 3, *Differential Equations*, p. 31–40. Institute of Mathematics of NAS of Belarus, Minsk, 2006.

### 4. Submitted/in preparation:

- (a) M. Reissig, J. Wirth, *Anisotropic thermo-elasticity in 2D*, Asymptotic Analysis, submitted  
Preprint, arXiv:math.AP/0704.0125
- (b) M Ruzhansky, J Wirth, *Dispersive estimates for hyperbolic systems with time-dependent coefficients*
- (c) F. Hirosawa, J. Wirth, *Non-effective dissipation with oscillating coefficients*
- (d) J. Wirth, *On the influence of time-periodic dissipation on energy and dispersive estimates*, Hiroshima Math. J., submitted  
Preprint, arXiv:math.AP/0510343

**5. Further Preprints:**

- (a) J. Wirth, *On the existence of the Møller wave operator for wave equations with small dissipative terms*, Preprint, arXiv:math.AP/0210098,
- (b) M. Reissig, J. Wirth, *Wave equations with monotone weak dissipation*, Preprint 2003-3, Fakultät für Mathematik und Informatik, TU Bergakademie Freiberg
- (c) J. Wirth, *Anisotropic media in 2D and their thermo-elastic properties*, Preprint, arXiv:math.AP/0708.0315

### **Invited Presentations, Participation at Conferences**

The following list contains conferences and workshops on which I participated, talks at research seminars and further invited talks.

- 2/2000, 2/2001 Spring School, University of Potsdam
- 7/2001 Workshop on Evolution Equations, Banach Center Warsaw, Poland
- 9/2001 DMV Studierendenkonferenz Aachen
- 2/2002 Seminars at University of Tsukuba and Waseda University Tokio
- 7/2002 Workshop “Analyse des Equations aux Derivees Partielles”, Centre de Mathematiques, Ecole Polytechnique Paris, in Forges-les-Eaux , France
- 9/2002 Conference on Partial Differential Equations on Spaces with Geometric Singularities, Bulgarian Academie of Science, Sofia, Bulgaria
- 5/2003 “Bimestre Intensivo” on “Microlocal Analysis and Related Subjects”, University and Politecnico of Torino, Italy
- 6/2003 Symposium on Qualitative properties of solutions of hyperbolic and Schrödinger equations, Freiberg,
- 3/2004 Seminar at the Institute of Computational Mathematics and Applied Physics, Beijing
- 3/2004 Chinese – German Workshop on Partial Differential Equations, Weihai (Shandong University), China
- 3/2004 Invited lecture at the Imperial College, London
- 6/2004 4th World Congress of Nonlinear Analysts, Florida
- 9/2004 Seminar at the University of Pisa
- 11/2004 Seminar “Mathematical Physics” TU Dresden
- 1/2005 Invited lecture at TU Darmstadt
- 2/2005 German-Chinese Workshop on Partial Differential Equations, University Potsdam
- 5/2005 Conference on Fourier Analysis and Hyperbolic PDEs, Imperial College London
- 7/2005 5th International ISAAC Congress, University Catania
- 10/2005 Symposium at Hiroshima University
- 10/2005 Seminar at Kyushu University, Fukuoka

- 10/2005 Symposium on Mathematical Models of Phenomena and Evolution Equations at RIMS, Kyoto University
- 10/2005 Seminars at Waseda University and Chuo University, Tokio
- 1/2006 Seminar at the University of Konstanz
- 2/2006 German-Chinese Workshop on Partial Differential Equations, TU Clausthal
- 6/2006 AIMS' Sixth International Conference on Dynamical Systems, Differential Equations and Applications, Poitiers, France
- 9/2006 4'th International Conference "Analytical Methods of Analysis and Differential Equations" (AMADE-2006), Minsk, Belarus
- 10/2006 Seminar at Imperial College, London
- 11/2006 London Analysis and Probability Seminar, King's College, London
- 11/2006 Workshop on "Regularity of Hyperbolic Problems" in Bertinoro (Forlì), Italy
- 1/2007 Workshop on "Interplay between pseudo-differential operators and PDEs" in Torino, Italy
- 4/2007 Seminars at Tsukuba University, Chuo University, Tokyo, and Tokai University
- 4/2007 Lecture at Nihon University, Tokyo
- 8/2007 6th International ISAAC Congress, Ankara
- 9/2007 Chinese-German Workshop, Xi'an
- 9/2007 Seminars at Zhejiang University, Hangzhou, and Jiao Tong University, Shanghai

#### **Invited stays at other institutes**

- 2/2002 University of Tsukuba, Japan,  
Lectures in the research seminar in Tsukuba and at the Waseda University, Tokyo
- 10/2002 Max-Planck-Institute for Mathematics in the Applied Sciences, Leipzig
- 9/2004 University of Pisa
- 9,10/2005 Chuo University, Tokio, University of Hiroshima and Waseda University, Tokio,  
financed by a grant of DMV and DFG
- 4/2007 Chuo University Tokio, financed by grant DFG 446 JAP 111/3/06
- 9/2007 Shanghai Jiao Tong University, financed within the German-Chinese research  
project DFG 446 CHV 113/170/0-1,2

## References

- Prof V. Georgiev  
Università di Pisa  
Dipartimento di Matematica ‘L. Tonelli’  
Largo Bruno Pontecorvo 5  
56127 Pisa, ITALY  
georgiev@dm.unipi.it
- Prof K. Mochizuki  
Chuo University Tokyo  
Faculty of Science and Engineering  
Department of Mathematics  
Bunkyo-ku, Tokyo 112-8551, JAPAN  
mochizuk@math.chuo-u.ac.jp
- Prof M. Reissig  
TU Bergakademie Freiberg  
Institute of Applied Analysis  
09596 Freiberg, GERMANY  
reissig@math.tu-freiberg.de
- Dr M. Ruzhansky  
Imperial College London  
Department of Mathematics  
180 Queen’s Gate  
London SW7 2AZ, UK  
m.ruzhansky@imperial.ac.uk
- Prof D. Vassiliev  
University College London  
Department of Mathematics  
Gower Street  
London WC1E 6BT, UK  
dima@math.ucl.ac.uk

London, September 26, 2007

(Dr J Wirth)