

Curriculum Vitae

Name Titus Willem Hilberdink

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Date of Birth February 6, 1968

Present Appointment

Lecturer in Pure Mathematics — appointed September 2000.

Address: Department of Mathematics, University of Reading, Whiteknights, PO Box 220, Reading RG6 6AX.

Main duties and responsibilities: Teaching undergraduate mathematics courses; conducting research; various administrative duties.

Previous Appointments

Jan 2000 - June 2000 Visiting Lecturer, Goldsmiths College, University of London.

1999 - Jan 2000 Research Fellow, Chinese University of Hong Kong, Hong Kong.

1998 - 1999 Fixed-term Lecturer, Goldsmiths College, University of London.

1996 - 1998 Visiting Tutor, Goldsmiths College, University of London.

1993 - 1996 Part-time Tutor, Goldsmiths College, University of London.

1992 - 1993 Lecturer in Mathematics, Lewisham College (for further education).

1989 - 1990 Tutor, University of Cambridge.

Education

1997 PhD in mathematics, University of London.

1990 Certificate of Advanced Mathematics (Part III), University of Cambridge.

1989 MA (Hons) in Mathematics, University of Cambridge.

Professional Bodies

Member of Institute of Teaching and Learning (2003).

Research activity

Research Interests

Analytic number theory, asymptotic analysis and Tauberian theory, functional equations.

My recent research in number theory includes a study of Beurling (or generalised) prime systems, which generalises the notion of prime numbers and the integers formed from them, see [9], [10], [11]. Of particular interest are systems where the prime and integer counting functions are simultaneously ‘well-behaved’. It was shown in [9] that, under the Riemann Hypothesis, the rational primes constitutes a ‘best-possible’ system of Beurling primes in this sense. Further evidence of this is obtained in [11], by considering the Lindelöf function associated to a Beurling prime system.

Further, I have worked on ‘Multiplicative Toeplitz’ matrices [13], whose $(i, j)^{\text{th}}$ -entry is a function of i/j (as opposed to a function of $i - j$). Such matrices are of number-theoretic significance; for example, with multiplicative coefficients, they factorise as ‘Euler products’. Formulas for determinants of truncated matrices with multiplicative coefficients are obtained, showing how they are linked with determinants of Toeplitz matrices.

Other recent work includes a study of growth rates of real functions [12]. A general notion of order is defined with which can be measured the growth rate of a function with respect to a given function. This idea is applied to give simple and natural criteria for the uniqueness of fractional iterates of a function.

Invited Conferences

- [1] *AMS Annual meeting; special session - “Fractal Geometry and Number Theory: A Jubilee of Benoit Mandelbrot”*, San Diego, (January 2002).
- [2] *Joint AMS-SMF meeting; special session - Fractal Geometry, Number theory and Dynamical systems*, Ecole Normale, Lyon (July 2001).
- [3] *Workshop on Fractals and Dynamical Systems*, Department of Mathematics, The Chinese University of Hong Kong (December 2000).
- [4] *Jordan Structures in Analysis and Geometry*, Goldsmiths College, London, (March 1998).
- [5] *Fractals and Wavelets*, Department of Mathematics, University of Pittsburgh (May 1994) with financial support from the conference.

Other Conferences attended

- [1] *Journée Arithmétiques*, University of Edinburgh, July 2007. [2] *Recent Perspectives in Random Matrix Theory and Number Theory*, Newton Institute workshop, University of Cambridge, March 29 - April 8, 2004.
- [3] London Mathematical Society Invited Lectures Series 1996: Frederick Almgren, *Geometric Measure Theory and the Calculus of Variations*, University College, London, (D. Preiss) April 1996.

Publications

- [1] On the Taylor coefficients of the composition of two analytic functions, *Annales Academiae Mathematica Fennicae Series I*, A. Vol. **21**, (1996) 189-204.

- [2] (With C.-H. Chu) The convolution equation of Choquet and Deny on Nilpotent groups, *Integral equations and Operator Theory*, Vol. **26** (1996) 1-13.
- [3] An integral formula for Taylor coefficients of a Class of Analytic functions, *Journal of Mathematical Analysis and Applications* **233**, (1999) 266-275.
- [4] (with C.-H. Chu and J. D. Howroyd) A matrix-valued Choquet-Deny theorem, *Proc. Amer. Math. Soc.* **129**, no. 1 (2000) 229-235 .
- [5] A functional equation for the cotangent on the open unit interval, *Aequationes Math.* **61** (2001) 179-189.
- [6] A Tauberian theorem for power series, *Archiv der Math.* **77** (2001) 354-359.
- [7] (with C. Whitehead and N. Z. Salvi) On a problem on generalised Fibonacci cubes, *Ars Combin.* **68** (2003), 39-47.
- [8] Some connections between Bernoulli Convolutions and Analytic Number Theory, in: *Fractal Geometry and Number Theory: A Jubilee of Benoit Mandelbrot* (M. L. Lapidus and M. van Frankenhuysen, eds.), Proc. Sympos. Pure Math., **72**, Part 1, Amer. Math. Soc., Providence R. I., 2005, pp. 233-271.
- [9] Well-behaved Beurling primes and integers, *Journal of Number Theory* **112** (2005) 332-344.
- [10] (with M. Lapidus) Beurling Zeta Functions, Generalised Primes and Fractal Membranes, *Acta Applicandae Mathematicae* **94** (2006) 21-48.
- [11] Determinants of multiplicative Toeplitz matrices, *Acta Arithmetica* **125** (2006) 265-284.
- [12] A lower bound for the Lindelöf function associated to generalised integers, *Journal of Number Theory* **122** (2007) 336-341.
- [13] Orders of growth of real functions, *Real Analysis Exchange* **32** (2006/7) 359-390.
- [14] On the zeros of a class of Arithmetical entire functions, *Acta Arithmetica* **131** (2008) 69-85.
- [15] Asymptotic expansions for Taylor coefficients of the composition of two functions (submitted to Journal of Analysis and Applications).

Teaching activity

Courses Taught

Sept 2000 - present at the University of Reading:

- First-year courses: Analysis I, Mathematics for Scientists
- Second-year courses: Analysis II
- Third-year courses: Topology, Functions of a complex variable, Number Theory.

1993 - 2000 at Goldsmiths College:

- 1998 - 2000. Lecture courses in Stochastic Processes, Mathematical Modelling, and Optimization.
- 1996 - 1998. Lecture course in Mathematical Modelling (foundation-year). Assisted to computer course (SPSS for Psychology), and Quantitative Methods.
- 1993 - 1996. Tutorials given in the first-year mathematics courses.

1992 - 1993 at Lewisham College. Access course and GCSE in mathematics

1989 - 1990 at University of Cambridge. Tutorials in first and second year analysis and complex analysis.

PhD students Currently supervising PhD student in analytic number theory.

Administrative Duties

Open day organiser. Duties include: overall organisation, liaising with other departments to ensure smooth running of open day.

Convenor of first-year undergraduate courses. Duties include: organising first-year tutorials, keeping staff and students informed of any changes.