

PHILIPPE H. TRINH

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SUMMARY OF QUALIFICATIONS AND ASSETS

I am a D.Phil. student at OCIAM, the Oxford Centre for Industrial and Applied Mathematics. My research interests include asymptotic analysis, nonlinear waves, and free-surface flows. For example, I am currently studying the application of newly developed techniques in exponential asymptotics to the problem of low-speed free-surface flows over an obstruction or near a ship. This research is in collaboration with S.J. Chapman (Oxford) and J.-M. Vanden-Broeck (UCL).

I first started doing research at the age of sixteen on the topic of Mathematical Genomics; this culminated in the co-authorship of two papers before my high school graduation. However, as an undergraduate, I was introduced to the application of asymptotic approximations to study various KdV-like equations, and my interest in this field and these methods have continued ever since. In addition to my research interests, I also maintain a passion for educational, philosophical, and historical issues in mathematics, and have written on some of these issues in popular science and maths magazines.

I am heavily involved in a variety of research, teaching, and extra-curricular activities. I am also a two-time recipient of the prestigious Canadian Governor General's Academic Medal (2004, 2006)

EDUCATION

- 2007 – Present **Doctor of Philosophy in Mathematics**
University of Oxford, Balliol College
- Area: Exponential asymptotics and free surface flows
- 2006 – 2007 **Master of Science in Applied Mathematics**
Carleton University (Ottawa, Ontario)
- Area: Asymptotics and KdV-Type equations
- 2004 – 2006 **Bachelor of Mathematics in Pure Mathematics**
Carleton University (Ottawa, Ontario)

I completed my Canadian undergraduate degree in 2 years with the highest grade point average (12.0/12.0) among the university's graduating class of 3200 students

RESEARCH INTERESTS AND EXPERIENCE

- 2007 – Present **Exponential asymptotics and free-surface flows**
I develop asymptotic methodologies for studying low-speed free-surface flows. Recently, I have been applying exponential asymptotics to problems of ideal gravitational and capillary flows near ships or over varying topographies.
- Supervised by:**
- S.J. Chapman (University of Oxford)
- 2005 – 2007 **Asymptotics and Korteweg-de Vries type equations**
I researched the asymptotic solutions of a broad class of forced Korteweg-de Vries equations (KdVB, mKdVB, and eKdVB). I also studied generalised pairs of coupled Korteweg-de Vries equations.
- Supervised by:**
- D.E. Amundsen (Carleton University)

Hydrodynamics
Free-Surface Flows
Nonlinear Waves
Asymptotics
Numerical Analysis

KdV Equations
Resonant Solutions
Asymptotics
Numerical Analysis

2003 – 2004	<p>Mathematical Genomics</p> <p>I studied the unaligned regions between syntenic blocks conserved on human/mice genomes in order to determine the mechanisms behind genome rearrangement</p> <p>I also examined the findings of a group of researchers regarding the 'fragility' of breakpoints in the human/mouse genomes in order to critique a possible weakness in their analysis.</p> <p>Supervised by:</p> <ul style="list-style-type: none"> • D. Sankoff (University of Ottawa,) 	<p>Genomes</p> <p>Statistics</p> <p>Modelling</p> <p>Computational Biology</p>
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TEACHING EXPERIENCE

2008 – 2009	<p>Departmental Tutor</p> <p>Mathematical Institute, University of Oxford</p> <p>Michaelmas 2007</p> <ul style="list-style-type: none"> • B6.a Mathematics of Viscous Flows (3rd year, Maths) • C6.3a Perturbation Methods (4th year, Maths) <p>Hilary 2008</p> <ul style="list-style-type: none"> • C6.3b Applied Complex Analysis (4th year, Maths) <p>Trinity 2009</p> <ul style="list-style-type: none"> • Consultations for B6.a Viscous Flows • Consultations for C6.3a Perturbation Methods 	<p>I began as a private tutor in high school, and since then, have maintained a passion for teaching and for the study of educational issues in mathematics I have taught maths in Canada, Britain, and Kenya.</p>
2007 – 2008	<p>Departmental Teaching Assistant</p> <p>Mathematical Institute, University of Oxford</p> <p>Michaelmas 2007</p> <ul style="list-style-type: none"> • B6.a Mathematics of Viscous Flows (3rd year, Maths) <p>Hilary 2008</p> <ul style="list-style-type: none"> • B6.b Waves and Compressible Flow (3rd year, Maths) • C6.3b Applied Complex Variables (4th year, Maths) 	
Summer 2007	<p>High School Teacher (Global Volunteer Network)</p> <p>Dagoretti Hidden Talents School (Nairobi, Kenya)</p> <ul style="list-style-type: none"> • Taught secondary mathematics and physics. 	<p>In the summer of 2007, I spent several months teaching mathematics to a large orphanage in Kenya.</p>
2006 – 2007	<p>Departmental Tutor/Teaching Assistant</p> <p>Department of Mathematics, Carleton University.</p> <p>Fall 2006</p> <ul style="list-style-type: none"> • Math 1107 (1st year, Linear Algebra for Sciences) • Math 1119 (1st year, Linear Algebra for Business) <p>Winter 2007</p> <ul style="list-style-type: none"> • Math 3001, Real Analysis (3rd year, Maths) • Math 3008, Differential Equations (3rd year, Maths) 	

2005 – 2006 **Departmental Tutor/Teaching Assistant**
Department of Mathematics, Carleton University.

Fall 2005

- Math 1007 (1st year, Calculus for Sciences)

Winter 2006

- Math 2454, Differential Equations (3rd year, Maths)

SELECTION OF ACADEMIC ACHIEVEMENTS/AWARDS

Scholarships and Fellowships

- Clarendon Fellowship (Oxford, 2007-2010)
- NSERC Postgraduate Doctoral Scholarship (Canada, 2007)
- Faculty of Graduate Studies and Research Scholarship (Carleton, 2006)
- Carleton Mathematics Departmental Scholarship (Carleton, 2004-2006)
- Commonwealth Scholarship (CSFP, 2007) (*Declined*)
- Cambridge Trusts Scholarship (Univ. Cambridge, 2007) (*Declined*)

In 2007, I was nominated by the Canadian Sciences and Engineering Research Council as the most outstanding candidate at the Doctoral level by the Mathematical Sciences Scholarships and Fellowships Selection Committee in consideration for the Andrew Hamer Postgraduate Prize.

Individual Awards and Medals

- Gary S. Duck Award in Physics, Math, and Photonics (Carleton, 2007)
- USRA NSERC Undergrad. Research Award (Carleton, 2005, 2006)
- Helga H. Shirmer Mathematics Award (Carleton, 2005)

The G.G. Academic Medal is presented on behalf of the Governor General to the top student of an entire graduating class. It represents the most prestigious award that a student can receive at a Canadian institution.

Canadian Governor General's Academic Medal

- Silver Medal (Undergraduate) (2006)
- Bronze Medal (High School) (2004)

INVITED TALKS

P. Trinh (2009) "How can exponential asymptotics be used to find hidden surface waves in low-speed flows?," British Applied Mathematics Colloquia (BAMC), Nottingham, UK.

P. Trinh (2009) "Exponential asymptotics and stern waves", 5th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, Athens, Georgia.

P. Trinh (2009) "Asymptotics beyond-all-orders and the Devil: Mathematical, physical, historical, and philosophical significance in 15 minutes or less," Balliol Jowett Scholarship competition, Oxford, UK.

P. Trinh (2008) "Unifying resonant solutions of a broad class of KdV equations," Junior Applied Mathematics Seminars (JAMS), Oxford, UK.

P. Trinh and D. Amundsen (2007). "Resonant solutions of the periodically forced eKdVB equation", 8th Int. Conf. Math. Num. Asp. Waves (Waves 2007), Reading UK.

PUBLICATIONS, CONFERENCE PROCEEDINGS, AND INTERNAL REPORTS

P. Trinh and S.J. Chapman (2009) “Exponential asymptotics and gravity-capillary waves Proc. 9th Int. Conf. Math. Num. Asp. Waves (Waves 2009), To Appear.

P. Trinh, S.J. Chapman and J.-M. Vanden-Broeck (2009) “Exponential Asymptotics and Stern Waves,” Proc. 5th IMACS Int. Conf. Evol. Equat. Nonl. Waves, Athens, Georgia.

P. Trinh and D. Amundsen (2008) “Unifying Steady-State Resonant Solutions of a Broad Class of KdV-Type Equations,” J. Comp. App. Math., To Appear.

P. Trinh and D. Amundsen (2007) “Resonant solutions of the periodically forced eKdVB equation”, Proc. 8th Int. Conf. Math. Num. Asp. Waves (Waves 2007), University of Reading, 120-122.

P. Trinh (2005) “Steady Solutions of a Coupled Korteweg-de Vries Equation,” Internal report submitted to Dr. David Amundsen (NSERC USRA 2005)

D. Sankoff, **P. Trinh** (2005) “Chromosomal breakpoint re-use in genome sequence rearrangement,” J. Comp. Bio., 12:812–821.

P. Trinh, A. McLysaght, and D. Sankoff (2004). “Genomic features in the breakpoint regions between syntenic blocks,” Bioinformatics 20, Suppl 1:I318-I325. (Acceptance rate: 10%, 50/492)

D. Sankoff, **P. Trinh** (2004). “Chromosomal breakpoint re-use in the inference of genome sequence rearrangement,” Proc. RECOMB 04. New York: ACM Press, 30–5. (Acceptance rate: 18%, 38/215)

MATHEMATICAL EXPOSITORY WRITING

P. Trinh (2009) “Brad gets Jolie and I get...math? Maths of facial recognition,” Pi in the Sky, In Press.

P. Trinh (2009) “Seeing the unseen”, a poster for the 2nd SIAM Student Chapter Conference in Oxford.

- First prize winner of the poster competition
- Judging committee: David Acheson (Oxford), Nick Higham (Manchester), Mason Porter (Oxford)

P. Trinh (2009) “The unnatural nature of asymptotic approximations,” iSquared Magazine, 6:18-29.

P. Trinh (2008) “Did a philosopher kill WALL-E?” +Plus Magazine, News Release, May-Aug 08.

P. Trinh (2008) “Maths on a Plane” +Plus Magazine, 47.

- Winner of the +Plus Magazine 2008 New Writer’s Award
- Judging committee: Michael Blastland (BBC), Robert Hunt (Cambridge), and Ian Stewart (Warwick)

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