

# CURRICULUM VITAE

**Peter Dalakov**

Institute of Mathematics and Informatics [www.math.bas.bg/algebra/dalakov/](http://www.math.bas.bg/algebra/dalakov/)  
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## EDUCATION

**PhD, Mathematics (May 2008)** University of Pennsylvania  
Philadelphia, PA  
Adviser: Prof. Tony Pantev  
**MS, Nuclear & Particle Physics (July 2000)** Sofia University, Sofia, Bulgaria  
Adviser: Prof. Stefan Ivanov

## EMPLOYMENT

**Research Associate** Algebra & Logic Sector  
Institute of Mathematics & Informatics, BAS  
April 1, 2012 – present (on leave 2013)  
**Adjunct Assistant Professor** American Univ. in Bulgaria, Spring 2016 – present  
**Postdoc/Research Associate** SISSA, Trieste, Italy  
December 2012 – December 2013  
**Adjunct Assistant Professor** American University in Bulgaria, Fall 2012  
**Research Associate/researcher** Mathematical & Theoretical Physics Sector  
INRNE, BAS  
September 05, 2011 – March 31, 2012  
**Visiting Assistant Professor** Department of Mathematics & Statistics,  
UMass–Amherst, Amherst, MA  
August 31, 2008 – August 31, 2011.  
**Teaching Assistant** Department of Mathematics,  
University of Pennsylvania, Philadelphia, PA  
August 2002 – May 2008  
**Researcher** Mathematical & Theoretical Physics Sector,  
INRNE, BAS  
10.2001 – 06.2002, 09.2000 – 12.2000

## PUBLICATIONS AND PREPRINTS

- “*Lectures on Higgs moduli and abelianisation*”, preprint [arXiv 1609.00646](https://arxiv.org/abs/1609.00646)
- “*Meromorphic Higgs bundles and related geometries*, *J. of Geometry and Physics*, vol.109 (2016), pp. 44-67, also [arXiv.AG 1602.03672](https://arxiv.org/abs/1602.03672)
- “*Donagi–Markman cubic for the generalized Hitchin system*”, U.Bruzzo, P.Dalakov, *Int. J. Math*, Volume **25**, Number 2 (2014).
- “*On the L-infinity description of the Hitchin map*”, *Rend. Ist. Mat. Univ. Trieste*, vol.46 (2014), p.1–17
- “*A universal family of deformations for the uniformising Higgs bundle*”, preprint [arXiv 1111.6457](https://arxiv.org/abs/1111.6457)
- “*Harmonic spinors of the Dirac operator of connection with torsion in dimension four*”, P.Dalakov, S.Ivanov, *Class. Quant. Grav.* **18** (2001), pp.253–263.

## THESES

- “*Higgs Bundles and Opers*”, University of Pennsylvania PhD Thesis (2008), [ProQuest AAI 3309421](#), ISBN: 978-0549-57408-8.
- “*Eigenvalue Estimates for the Dirac Operator of Connections with Torsion*”, MSc Thesis, Sofia University, 2000 (in Bulgarian).

## SERVICE

**Organised**

Reading Seminar in Algebraic Geometry (IMI-BAS) with H.Iliev	Spring 2016 Fall '15
UMass Mathematical Physics Seminar	Fall '12, Spring-Fall '14 Fall '10

**Supervised**

Graduate Independent Study: Moment maps & Toric Varieties	Spring '11
Independent Study: Mechanics on Coadjoint Orbits	Fall '10, Spring '11
Independent Study: Algebraic Topology	Spring '10

**Served as**

Scientific secretary of the Algebra & Logic Sector, IMI-BAS	Sep–Dec '12 May–July '14
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## TEACHING EXPERIENCE

**American University in Bulgaria, 2012, 2016 – present**

Finite Mathematics	2 semesters
Introduction to Calculus	2 semesters

**UMass – Amherst, 2008 – 2011**

Differential Geometry	1 semester
Multivariable Calculus	3 semesters
Honours Multivariable Calculus	2 semesters
Linear Algebra	3 semesters
Undergraduate Complex Analysis	1 semester

**University of Pennsylvania, 2002 – 2008**

Instructor for Calculus III	Summer '04
Instructor for Calculus IV	Summer '05, '06, '07
Teaching Assistant for Abstract Algebra	1 semester
Teaching Assistant for Advanced Calculus	1 semester
Teaching Assistant for Calculus III	6 semesters
Teaching Assistant for Calculus I, II	3 semesters
Grader : Geometry–Topology, Graduate Complex Analysis	1 semester
Tutoring Center or Sunday Night Reviews	6 semesters

## PEDAGOGICAL TRAINING

**Teaching Certificate Program:** Center for Teaching and Learning, University of Pennsylvania, 2007 – 2008. Certificate in college teaching.

**TA training program:** Department of Mathematics, University of Pennsylvania, August 2002

**ITA training program:** School of Arts and Sciences, University of Pennsylvania, June – August 2002

#### GRANTS, FELLOWSHIPS AND AWARDS

- CERES–CEI Research Fellowship, grant agreement 229 660 (FP 7, Marie Curie Actions) 2012–2013
- Research and Educational Support Fund Grant, UMass–Amherst, 2010
- Stipend by the “Eureka” foundation for youth creativity 1994 – 1999
- National Students’ Physics conference (Bulgaria), 1994 – first place

#### PROFESSIONAL MEMBERSHIPS

**AMS:** 2002 – present

**MAA:** 2005 – 2012

#### SELECTED TALKS AND LECTURE SERIES

- *Introduction to deformation theory*, graduate minicourse, Univ. of Freiburg, Germany, January 2016
- *Special Kähler geometry and Langlands duality for the ramified  $G_2$  Hitchin system*, workshop on Interactions between geometry and physics, Guarujá, Brazil, August 2015
- *Donagi–Markman cubic for the  $G$ -generalised Hitchin system*, workshop on The Geometry, Topology and Physics of Moduli Spaces of Higgs bundles, Singapore, July 2014
- *Donagi–Markman cubic for the generalised Hitchin system*, workshop on Instanton counting: Moduli spaces, Representation theory and Integrable Systems, Leiden, Netherlands, June 2014
- *Special Kähler geometry on the Hitchin base and Langlands duality*, Higher structures in algebraic analysis, Padova, Italy, February 2014
- *Donagi–Markman cubic for the generalised Hitchin system*, VBAC conference, Trieste, Italy, June 2013
- *Monodromy Deformations of opers*, School & Workshop on Algebraic Geometry and Physics, CIMAT, Guanajuato, Mexico, January 2013
- *Kähler Quantisation and Hitchin’s Connection* Lecture Course (20 talks), INRNE, Sofia, Bulgaria, February – July 2012
- *A brief overview of non-abelian Hodge theory*, IMI, BAS, Sofia, Bulgaria, January 2012
- *Hitchin’s Equations and Moduli spaces of Higgs bundles* 6 talks, INRNE, Sofia, Bulgaria, October–November 2011
- *Deformations of the Hitchin section and DGLAs*, Summer school and conference on Hodge theory and related topics, ICTP, Trieste, Italy, July 2010
- *Deformations of the uniformising Higgs bundle*, Hodge-theoretic reflections on the string landscape (workshop), ICMS, Edinburgh UK, June 2010
- *Remarks on the deformation theory of certain systems of Hodge bundles*, Valley Geometry seminar, UMass–Amherst, April 2010
- *The Moduli Space of Special Lagrangian Submanifolds of a Calabi–Yau manifold*, 3 talks, Mirror Symmetry Seminar, UMass–Amherst, October 2009
- *Non-Abelian Hodge Theory and the Kapustin–Witten approach to Geometric Langlands*, Math-Physics Seminar, INRNE, June 2009
- *An introduction to moment maps and reduction*, Reading Seminar in Algebraic Geometry, UMass–Amherst, February 2009
- *Non-Abelian Hodge Theory, Opers and the Hitchin Section*, 2 talks, Valley Geometry Seminar, UMass–Amherst, September 2008

- *Kuranishi Spaces for Analytic DGLA's*, 2 talks, Deformation theory seminar, UMass–Amherst, September 2008
- *A Short Walk in Non-Abelian Hodge Theory and the Kapustin–Witten Approach to Geometric Langlands*, 4 talks, Sofia University, August 2008
- *Higgs Bundles and Opers*, Geometry Seminar, Boston University, February 2008
- *Special Kähler Geometry*, student seminar on Mirror Symmetry, UPenn, December 2007
- *Weight Systems and Matrix Factorisations*, pre-colloquium talk, UPenn, January 2007
- *Higgs Bundles and Opers*, Conference on Vector Bundles and Moduli Spaces, Guanajuato, Mexico, December 2006
- *Hermite–Einstein connections and stability*, 3 talks, Stability Seminar, UPenn, June 2006
- *Some Aspects of Non-Abelian Hodge Theory*, GAeL XIV, Bedlewo, Poland, March 2006
- *Mutations and Helices*, Algebraic Geometry Bootcamp, Seattle, July 2005

#### OTHER CONFERENCES AND SCHOOLS

- School on Moduli Spaces in Algebraic Geometry and Physics, Hamburg, August 2013
- String-Math 2011 Conference, University of Pennsylvania, Philadelphia, June 2011
- Conference on Moduli Spaces and Moduli Stacks, Columbia U., NY, May 2011
- MIT Talbot Workshop on Non-Abelian Hodge Theory, Draper, Utah, May 2011
- Algebraic Geometry, North-Eastern Series workshops: SUNY-SB, October 2009; UMass–Amherst, April 2010; UConn, September 2010; MIT, April 2011
- Workshop on Modern Moduli Theory, MSRI, February 2009
- Conference on Algebro-Geometric Derived Categories and Applications, IAS, Princeton, March 2008
- Workshop on Gauge Theory and Representation Theory, IAS, Princeton, November 2007
- Workshop on Homological Mirror Symmetry and Applications I & II, IAS, Princeton, January & March 2007
- Workshop on Algebraic Geometry and Physics, University of Pennsylvania, November 2005
- AMS Summer Research Institute in Algebraic Geometry, Seattle, August 2005
- Summer School in Noncommutative Geometry, ICTP, Trieste, Italy, August 2004
- Summer School in Particle Physics, ICTP, Trieste, Italy, June 1999

#### PERSONAL

**Name:** Dalakov, Peter Gueorgiev  
**Nationality:** Bulgarian  
**Date of birth:** 29 July 1975  
**Languages:** English, Russian (fluent), Italian (basic)

#### REFERENCES

- Tony Pantev, University of Pennsylvania, email: tpantev@math.upenn.edu
- Ugo Bruzzo, SISSA, email: bruzzo@sissa.it
- Ron Donagi, University of Pennsylvania, email: donagi@math.upenn.edu
- Gueo Grantcharov, Florida International University, email: grantchg@fiu.edu
- Eyal Markman, University of Massachusetts–Amherst, email: markman@math.umass.edu
- Antonella Grassi, University of Pennsylvania, email: grassi@math.upenn.edu (teaching)
- Farshid Hajir, U Massachusetts–Amherst, email: hajir@math.umass.edu (teaching)