Date: 02/09/2012

NERO BUDUR

Current address:
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Education:

Ph.D., University of Illinois at Chicago, Mathematics (Ph.D. advisor: Prof. Lawrence Ein.)	1998-2003
B.S., University of Illinois at Chicago, Mathematics	1996-1998
W. Wright Community College Chicago	1996
GED (high-school diploma equivalent)	1995

Positions:

H.J. Kenna Assistant Professor (Tenure-track)	University of Notre Dame	2007 - current
J.J. Sylvester Assistant Professor	Johns Hopkins University	2003 - 2006
Teaching / Research Assistant	University of Illinois at Chicago	1999 - 2003

Visiting Positions:

CIRM, Trento, Italy	6/2011
Johns Hopkins University	1-8/2011
MPI Bonn, Germany	11/2010
IHES Bures-sur-Yvette, France	10/2010
Université de Nice, France	9/2010, 1/2011
Institute of Advanced Study, Princeton	2006 - 2007
Harvard University	9-12/2002
University of Hong Kong	9-12/1999

Other formative experience:

Winter School - Algebraic Geometry	Univesity of Warwick	2002
Summer School - Algebraic Geometry	University of Catania	2000
Summer School - Algebraic Geometry	ICTP Trieste	2000
Arizona Winter School	University of Arizona	1999-2002
REU Summer Program	Williams College	1998

Teaching:

As instructor:

- directed 1 reading course in Commutative Algebra.
- directed 4 reading courses in Algebraic Geometry.
- Linear Algebra : 1 semester.
- Graduate Algebra : 1 one-year course.
- Algebraic Geometry: 1 one-year course and 2 one-semester courses.
- Topics in Algebraic Geometry: Singularities: 1 semester.
- Calculus II for Business: 3 semesters. One semester as coordinating chair.
- Calculus I for Science and Engineering: 6 semesters.
- Calculus I for Biology and Social Sciences: 6 semesters.

As teaching assistant:

- Calculus I, II, III.

Research interests:

Algebraic Geometry (higher dimensional algebraic varieties, singularities). My interests are connected with: topology (Milnor fibrations, local systems), number theory (Igusa local zeta functions), representation theory (D-modules), combinatorics (hyperplane arrangements), differential geometry (geometric stability).

Publications and preprints:

Refereed publications:

1. Nero Budur, "On Hodge spectrum and multiplier ideals". *Math. Ann.* 327 (2003), 257–270.

2. Nero Budur, Marta Casanellas and Elisa Gorla, "Hilbert functions of irreducible arithmetically Gorenstein schemes". *J. Algebra* 272, no. 1 (2004), 292–310.

3. Nero Budur and Morihiko Saito, "Multiplier ideals, V-filtration, and spectrum". *J. Algebraic Geom.* 14 (2005), 269–282.

4. Nero Budur, "On the V-filtration of D-modules", in *Geometric methods in algebra and number theory*, edited by F. Bogomolov and Yu. Tschinkel, Progress in Mathematics 235, Birkhäuser (2005).

5. Nero Budur, Mircea Mustaţă and Morihiko Saito, "Bernstein-Sato polynomials of arbitrary varieties". *Compositio Math.* 142 (2006), 779–797.

6. Nero Budur, Mircea Mustaţă and Morihiko Saito, "Roots of Bernstein-Sato polynomials for monomial ideals: a positive characteristic approach". *Math. Res. Lett.* 13 (2006), 125–142.

7. Nero Budur, Mircea Mustaţă and Morihiko Saito, "Combinatorial description of the roots of the Bernstein-Sato polynomials for monomial ideals". *Comm. Algebra* 34 , no. 11 (2006), 4103–4117.

8. Nero Budur, "Unitary local systems, multiplier ideals, and polynomials periodicity of Hodge numbers". *Adv. Math.* 221 (2009), 217–250.

9. Nero Budur, "Jumping numbers of hyperplane arrangements". *Comm. Algebra* 38, no. 3 (2010), 1122–1136.

10. Nero Budur and Morihiko Saito, "Jumping coefficients and spectrum of a hyperplane arrangement". *Math. Ann.* 347, no. 3 (2010), 545–579.

11. Nero Budur, Alexandru Dimca, and Morihiko Saito, "First Milnor cohomology of hyperplane arrangements", in *Topology of Algebraic Varieties and Singularities*, Contemp. Mathematics 538 (2011), 279–292.

12. Nero Budur, Mircea Mustaţă, and Zach Teitler, "The Monodromy Conjecture for hyperplane arrangements". *Geom. Dedicata* 153, no. 1 (2011), 131–137.

13. Nero Budur, Morihiko Saito, and Sergey Yuzvinsky, "On the local zeta functions and b-functions of certain hyperplane arrangements". With an appendix by W. Veys. *J. London Math. Soc.* (2) 84 (2011), 631–648.

14. Nero Budur, "Complements and higher resonance varieties of hyperplane arrangements". *Math. Res. Lett.* 18, no. 05 (2011), 859–873.

15. Nero Budur, "Singularity invariants related to Milnor fibers: survey". arXiv:1012.3150. To appear in *Recent Trends on Zeta Functions in Algebra and Geometry*, Contemp. Mathematics.

16. Nero Budur, Pedro G. González-Pérez, and Manuel González Villa, "Log canonical

thresholds of quasi-ordinary hypersurface singularities". arXiv:1105.2794. To appear in *Proc. A.M.S.*

Other:

Nero Budur, "Multiplier ideals, Milnor fibers, and other singularity invariants", notes from a 5-lectures course at CIRM, Luminy, January 2011.

Nero Budur, "Hodge spectrum of hyperplane arrangements". arXiv: 0809.3443. Partly superseded by 10.

Nero Budur, "Multiplier ideals and filtered D-modules". math.AG/0305247. Superseded by 3.

Nero Budur, "Multiplier ideals and Hodge Theory", Ph.D. thesis, University of Illinois at Chicago, 2003.

All articles are available on the Mathematics Arxiv.

Invited lectures and addresses:

Courses:

01/2011 *Course on Multiplier Ideals in Singularity Theory* (5 lectures) at the conference "Multiplier Ideals in Commutative Algebra and Singularity Theory", CIRM Luminy, France.

Seminars, colloquia, workshop, and conference talks (including upcoming):

08/2013 Workshop on Mixed Hodge Modules, Clay Insitute.
06/2013 Conference in honor of A. Dimca and S. Papadima, Mangalia, Romania.
09/2012 Workshop "Singularities", Oberwolfach, Germany.
07/2012 Conference "Birational geometry and other fields", Durham, UK.
06/2012 Conference "Arrangements in Pyrénées", Pau, France.
05/2012 AIM Workshop "Motivic DT theory and singularities", Budapest, Hungary.
03/2012 AMS meeting, University of Kansas, Lawrence, Kansas; Singularities.
03/2012 Workshop "Singularities in Midwest", University of Wisconsin.
12/2011 Conference "Algebraic Geometry", Chulalongkorn Univ., Bangkok, Thailand.
11/2011 Research program in local analytic geometry, Schrödinger Institute, Vienna.
10/2011 AMS meeting, University of Utah, Algebraic Geometry.
06/2011 7^{th} Congress of Romanian Mathematicians, Braşov, Romania.

06/2011 University of Trento, Italy. Algebraic Geometry Seminar.
06/2011 University of Science and Technology of China, Hefei. Geometry Seminar.
04/2011 AMS meeting, College of Holy Cross, Hyperplane Arrangements.
02/2011 Johns Hopkins University, Algebraic Geometry and Number Theory Seminar.
02/2011 Northeastern University, GASC Seminar.
02/2011 100^{th} Congress of Spanish Royal Math. Soc., Ávila. Algebraic Geometry.
11/2010 Gutenberg Universität Mainz, Germany, Algebraic Geometry Seminar.
11/2010 Leibniz Universität Hannover, Germany, Algebraic Geometry Seminar.
10/2010 Katholieke Universiteit Leuven, Belgium, Algebraic Geometry Seminar.
09/2010 Université de Nice, France, Séminaire d'Algèbre, Géométrie et Topologie.
06/2010 "Al. Myller" Mathematical Seminar Centennial Conference, Iaşi, Romania.
06/2010 Workshop "Configuration Spaces and related structures", Pisa, Italy.
06/2010 AMS - Sociedad Matemática Mexicana Meeting, Singularities, Berkeley.
05/2010 Workshop "Zeta Functions in Algebra and Geometry", Mallorca, Spain.
05/2010 Mini-conference "Algecom", Purdue.
03/2010 Workshop "Singularities in Midwest", Madison.
12/2009 University of Wisconsin, Madison, Algebraic Geometry Seminar.
10/2009 Conference in honor of A. Libgober, University of Illinois, Chicago.
05/2009 Conference "Fundamental groups in Algebraic Geometry", Nice.
04/2009 Purdue University, Algebraic Geometry Seminar.
09/2008 Johns Hopkins University, Algebraic and Complex Geometry Seminar.
06/2008 University of Zürich, Algebraic Geometry Seminar.
04/2008 AMS Section Meeting, Bloomington, IN, D-modules.
12/2007 Workshop "Higher dimensional minimal model program", Warwick.
11/2007 Purdue University, Colloquium.
10/2007 University of South Florida, Tampa, Colloquium.
10/2007 AMS Section Meeting, Chicago, Algebraic Geometry.
08/2007 Workshop "F-singularities and D-modules", University of Michigan.
04/2007 Princeton University, Algebraic Geometry Seminar.
03/2007 Workshop on Higher Dimensional Algebraic Geometry, Taipei, Taiwan.
11/2006 University of Utah, Algebraic Geometry Seminar.
10/2006 University of Chicago, Algebraic Geometry Seminar.
10/2006 University of Illinois at Chicago, Algebraic Geometry Seminar.
10/2006 AMS Section Meeting, Cincinnati, Birational geometry.
10/2006 Institute of Advanced Study, Princeton, Algebraic Geometry Seminar.

06/2006 PIMS, University of British Columbia, Vancouver, Motives and Periods.

01/2006 University of Notre Dame, Colloquium.

10/2005 Columbia University, Algebraic Geometry Seminar.

09/2005 Rice University, Algebraic Geometry Seminar.

02/2005 Princeton University, Algebraic Geometry Seminar.

02/2005 CIRM, Luminy, Singularités.

01/2005 AMS-MAA Annual Joint Meeting, Atlanta, D-modules.

03/2004 "Asymptotic and Effective Results in Complex Geometry", Baltimore.

02/2004 Northwestern University, Algebraic Geometry Seminar.

12/2003 University of Miami, Geometric Methods in Algebra and Number Theory.

11/2003 University of Michigan, Algebraic Geometry Seminar.

10/2003 University of Maryland, Geometry-Topology Seminar.

04/2003 New York University, AMS Section Meeting, Topology of singularities.

04/2003 CIRM, Luminy, G.A.E.L.

02/2003 Johns Hopkins University, Algebraic Geometry Seminar.

11/2002 University of Illinois at Chicago, Algebraic Geometry Seminar.

06/2002 Newton Institute, Cambridge, UK, Higher Dimensional Complex Geometry.

01/2002 University of Warwick, UK, Teach-in on 3-folds.

11/1999 University of Hong Kong, Complex Algebraic Geometry Seminar.

Fellowships, Awards, Grants:

- 2010-2012: Young Investigator Research Grant from National Security Agency for "Problems on singularities in algebraic geometry". Role: PI. Amount: $30,000.

- 2011: Research in Pairs grant from Fondazione Bruno Kessler, Centro Internazionale per la Ricerca Matematica, Trento, Italy.

- 2010: AMS Grant for attending ICM in India.

- 2007-2010: Research Grant from National Science Foundation for "Local and global problems on singularities for higher dimensional algebraic varieties", proposal number DMS-0700360 under the program Algebra, Number Theory, and Combinatorics. Role: PI. Amount: $99,435.

- 2006: AMS Grant for attending ICM in Spain.

- 2005: conference organization grant from National Science Foundation for "Recent Developments in Higher Dimensional Algebraic Geometry Conference at Johns Hopkins University", proposal number DMS-0515842, jointly with V. Shokurov. Role: co-PI. Amount: $17,000.

- 1998-1999: University Fellowship, Graduate College, University of Illinois at Chicago,

- 1998: Louise Hay Award, University of Illinois at Chicago, for the outstanding undergraduate major in Mathematics.

Professional Memberships:

- American Mathematical Society and Mathematical Association of America.

Service to the University:

Advising:

- Youngho Yoon (Ph.D. student, 4th year); Elif Altinok (Ph.D. student, 1st year).

- Luis Saumell (Florida International University) (Summer program at Notre Dame, 06-08/2010).

Committees, seminar organization, and others:

- Postdoc Search Committee of the Mathematics Department (2011-2012).

- Algebra Search Committee of the Mathematics Department (2011-2012).

- Graduate Studies Committee of the Mathematics Department (08/2009 - 07/2010).

- represented the Notre Dame Math Department Graduate Program to prospective graduate students at the annual AMS - MAA joint meeting, San Francisco, 01/2010.

- coordinating chair for Calculus II for Business, Fall 2009.

- Ph.D. oral candidacy examination boards: Bernadette Boyle (Mathematics, Notre Dame, 12/18/2008); Megan Patnott (Mathematics, Notre Dame, 01/14/2009); Youngho Yoon (Mathematics, Notre Dame, 01/29/2010), Katie Ansaldi (02/2012).

- outside chair on Ph.D. oral candidacy examination board: Janine Rueegg (Biological Sciences, Notre Dame, 04/17/2009).

- Ph.D. thesis defense committee chair: Xiangning Li (Chemical Engineering, Notre Dame, 11/01/2007).

- Ph.D. thesis defense committes: Angela Kohlhaas (Mathematics, Notre Dame, 3/29/2010), Bonnie Smith (Mathematics, Notre Dame, 3/31/2010), Bernadette Boyle (Mathematics, Notre Dame, 3/2012).

- Ph.D. qualification exam committees in Mathematics, at Notre Dame: Algebra (08/2008, 01/2009, 05/2009, 08/2009, 01/2010).

- co-organizer with J. Migliore and C. Polini of the Algebraic Geometry / Commutative Algebra Seminar at Notre Dame University (2007- ...).

- seminar on “Motivic Milnor Fiber” with M. Kamensky and S. Starchenko (Spring 2012).

- web page organizer for the Graduate Students Algebraic Geometry / Commutative Algebra Seminar at Notre Dame University (2009 - ...).

- designed at Notre Dame graduate courses in Algebraic Geometry (Spring 2009, Fall 2008, Fall 2007), Singularities (Spring 2008), and designed and directed reading courses in Commutative Algebra (Spring 2009) and Algebraic Geometry (Fall 2009, Spring 2010).

- participated actively during the Recruitment Weekend at Notre Dame, Spring 2008.

- co-organizer with V. Shokurov of the Algebraic and Complex Geometry Seminar at the Johns Hopkins University (2003 - 2006).

Service to the world-wide Mathematics community:

- co-organizer with F. Loser (UPMC, Paris) and M. Mustaţă (Michigan) of a thematic program on “Motivic Invariants and Singularity Theory”, May-June 2013, at the Center of Mathematics at Notre Dame. The program consists of an undergraduate school, graduate school, and a conference.

- co-organizer with L. Ein of a special session on ”Singularities in Algebraic Geometry” at the AMS Central Section Meeting, Notre Dame, November 5-7, 2010.

- co-organizer with A. Corso, J. Migliore, C. Polini, B. Ulrich of MAGIC’10 (Midwest Algebra, Geometry, and their Interactions Conference) at Notre Dame, April 23-25, 2010.

- co-organizer with L. Ein, R. Lazarsfeld, M. Mustaţă, A. Pukhlikov, V. Shokurov of ”Birational geometry and numerical invariants of algebraic varieties” (July 31- August 4 2006), an workshop at the American Institute of Mathematics, Palo Alto, Ca.

- co-organizer with J. Kollár, S. Mori, V. Shokurov of the Japan American Mathematics Institute year-long (2005-2006) program, seminars, and end-of-program (March 10-16 2006) conference/workshop ”Recent Developments in Higher Dimensional Algebraic Geometry” at the Johns Hopkins University.

- reviewed articles for Mathematical Reviews and Zentralblatt MATH.

- refereed articles for publication in the journals: Advances in Mathematics, Bulletin de la Société Mathématique de France, Communications in Algebra, Compositio Mathematica, Geometriae Dedicata, International Mathematics Research Notices, Inventiones Mathematicae, Journal of Algebraic Geometry, Journal of Knot Theory and Its Ramifications, Manuscripta Mathematica, Mathematics Research Letters, Mathematische Annalen, Mathematische Zeitschrift, Proceedings of the American Mathematical Society, Transactions of the American Mathematical Society, ...

Service to the United States science community:

- advisor for Luis Saumell (Florida International University) under the Ronald E. McNair Postbaccalaureate Achievement Program, a federal program: 06-08/2010.

- served on a National Science Foundation panel: 2009.

- served as mail-in reviewer of grant proposals for the National Security Agency: 02/2011.

- served as mail-in reviewer of grant proposals for the National Science Foundation: 01/2007.

Programming Experience:

- wrote programs supporting mathematical computations in: C++, Macaulay 2, Singular, Risa/Asir (last three are Computer Algebra Systems).