

**SUNIL KUMAR CHEBOLU**  
**Curriculum Vitae**  
(updated June 2008)

University of Western Ontario  
Department of Mathematics  
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**RESEARCH INTERESTS**

- *Algebraic topology*: stable homotopy theory of spectra, chromatic stable homotopy theory, derived categories of rings and schemes, and simplicial methods.
- *Modular representation theory*: cohomology of groups, support varieties for modules, stable homotopy theoretic topics such as Freyd's generating hypothesis and Bousfield localisation, theory of idempotent modules, Auslander-Reiten theory and Tate cohomology.
- *Algebraic number theory*: Galois theory, Galois cohomology, quadratic forms, Bloch-Kato conjecture, Milnor  $K$ -theory, and related topics in arithmetic.
- Group schemes, triangulated categories, model categories and axiomatic stable homotopy theory

**EXPERIENCE AND EMPLOYMENT**

- Assistant Professor at Illinois State University, USA, starting August 2008.
- Postdoctoral Fellowship at the University of Western Ontario, Canada, Summer 2005 - June 2008.
- Postdoctoral Fellowship at the Institut Mittag-Leffler — The Royal Swedish Academy of Sciences, Sweden, Spring 2006.
- Research Assistantship at the University of Washington, USA, Spring 2005.
- Teaching Assistantship at the University of Washington, USA, Fall 2000 - Winter 2005.
- Visiting Students' Research Program, Tata Institute of Fundamental Research (TIFR), India, Summers of 1996-1998.

**EDUCATION**

Spring 2005      **Ph.D. in Mathematics**, University of Washington, Seattle, USA.  
THESIS: *Refinements of chromatic towers and Krull-Schmidt decompositions in stable homotopy categories.*  
ADVISOR: Prof. John H. Palmieri

Spring 2002      **Master of Science, Mathematics**, University of Washington, Seattle, USA.  
TOPIC: *Adams spectral sequence and stable homotopy groups of spheres.*  
ADVISOR: Prof. John H. Palmieri

Spring 2000      **Master of Statistics**, Indian Statistical Institute, Bangalore, India.  
SPECIALISATION: *Advanced probability and related topics.*

## RELEVANT PUBLICATIONS AND PREPRINTS

### Published papers

1. Refining thick subcategory theorems, *Fundamenta Mathematicae* **189** (2006), 61-97.
2. Thick subcategories of stable homotopy theory, *Oberwolfach Report* **8** (2006), 12-20.
3. Krull-Schmidt decompositions for thick subcategories, *Journal of Pure and Applied Algebra* **210** (2007) 11-27.
4. Abelian subcategories closed under extensions: K-theory and decompositions, *Communications in Algebra* **35** (2007) 807-819.
5. The generating hypothesis for the stable module category of a  $p$ -group, joint with David Benson, Dan Christensen and Ján Mináč, *Journal of Algebra* **310** (2007) 428-433.
6. Groups which do not admit ghosts, joint with Dan Christensen and Ján Mináč, *Proc. Amer. Math. Soc.* **136**, (2008) 1171-1179.
7. Ghosts in modular representation theory, joint with Dan Christensen and Ján Mináč, *Advances in Mathematics*, **217**, (2008) 2782-2799.

### Preprints

8. Freyd's generating hypothesis for groups with periodic cohomology, joint with Dan Christensen and Ján Mináč, 12 pages, preprint 2008, submitted, arXiv:0710.3356.
9. Finite generation of Tate cohomology, joint with Carlson and Mináč, 17 pages, preprint 2008, submitted, arXiv:math.0804.4246.
10. Classifying subcategories of modules over a principal ideal domain, 8 pages, preprint 2008, submitted math.AC/0607300.
11. Freyd's generating hypothesis with almost split sequences, joint with Jon Carlson and Ján Mináč, 7 pages, preprint 2008, submitted, arXiv:math.0806.2165.
12. Bloch-Kato pro- $p$  groups and the refinement of the Bloch-Kato conjecture, joint with Benson, Mináč and Swallow, 15 pages, preprint 2008.

### Work in progress (Manuscripts available upon request for items 13, 15, 16 and 17)

13. Decomposing Serre subcategories of finitely presented modules, (in preparation).
14. Refining the chromatic tower for the stable module category, (in preparation).
15. Representations of the Klein's four group and Galois theory, joint with Ján Mináč and John Swallow, (in preparation).
16. On Jennings sequences for  $p$ -groups, joint with Ajneet Dhillon and Ján Mináč, (in preparation).
17. Group extensions and Galois modules for the bicyclist, joint with Mináč, Schultz and Swallow, (in preparation).

### OTHER PUBLICATIONS

18. Refinements of chromatic towers and Krull-Schmidt decompositions in stable homotopy categories, Ph.D. thesis, University of Washington, 2005, arXiv:math.AT/0607726.
19. Puzzling Rectangles (joint with K.R. Manjunath), *Resonance* — Journal of science education, December 1997, Volume 2, Number 12.

## SELECTED RESEARCH VISITS

- University of Chicago, Jan 7-9, 2008, Peter May and Vigeik Angeltveit.
- MIT, Feb. 11-15, 2007, Haynes Miller.
- Johns Hopkins, March 5 - 13, 2007, Michael Ching.
- Wesleyan University, Feb. 4-10 2007, Mark Hovey and Keir Lockridge.
- University of Nebraska, Lincoln, Feb. 20-25, 2005, Srikanth Iyengar.

## SCHOLARSHIPS AND AWARDS

- *McFarlan Fellowship* for making excellent progress towards the Ph.D. in the mathematics department, University of Washington, 2005.
- Three *Watumull Awards* (**received three times in three consecutive years**) for outstanding performance in graduate school, University of Washington - 2002, 2003, and 2004.
- *Hewitt Academic Excellence Award* for outstanding performance in the core courses and preliminary examinations in the mathematics department, University of Washington, Fall 2001.
- *N.B.H.M Award and Scholarship* from the National Board for Higher Mathematics (NBHM), India, 1998 - 2000.
- *Student Fellowship* from the Indian Statistical Institute, Calcutta, India, 1995 - 1998.
- *Indian Mathematics Olympiad Award* (15th National Rank) from the Mathematics Today board, India, 1995.
- *Regional Mathematics Olympiad Award* (5th State Rank) from the NBHM, India, 1994.

## TEACHING EXPERIENCE

- **Illinois State University, USA, 2008-present.**
  - Calculus II (two sections) Tentative teaching assignment for Fall 2008.
- **University of Western Ontario, Canada, 2005-2008.**
  - Intermediate Calculus - Calculus 1000a, Summer 2008
  - Introductory Calculus - Math 012a, Fall 2007.
  - Intermediate Calculus - Calculus 081a, Summer 2007
  - Finite Mathematics - Math 028b, Summer 2006.
  - Intermediate Calculus - Math 051a, Summer 2006.
  - Introductory Calculus - Math 012a, Fall 2005.
  - Introductory Calculus - Math 012a, Fall 2005.
- **University of Washington, USA, 2000-2005.**
  - **Instructor for the following courses with full responsibility**
    - \* Linear Algebra, Math 308 - Summer 2004.
    - \* Differential Equations, Math 307 - Summer 2003.
    - \* Calculus with Analytical Geometry - III, Math 126 - Summer 2002.
  - **Teaching Assistant experience**
    - \* Calculus I, II and III (for 5 quarters).
    - \* Tutor at the Mathematics study centre - Summer 2001.
    - \* Made worksheets for Calculus - II - Spring 2001.
  - **Graded the following Graduate level courses**
    - \* Abstract Algebra (Math 504/5/6) - 2003-2004.

- \* Topology and Geometry of manifolds (Math 534/5/6) - 2002-2003.
- \* Complex Analysis (Math 526) - Spring 2002.

– **Teaching workshops and Mentoring experience**

- \* Worked as a teaching mentor for new TAs - Fall 2004.
- \* Participated in the experienced TA panel (workshop for new graduate TAs) - Fall 2004.
- \* Attended the international TA orientation workshop of the Centre for Instructional Development and Research (CIDR), Fall 2000.

**INVITED TALKS IN CONFERENCES AND MEETINGS**

- AMS special session on *Algebraic Topology and related topics* at UBC/PIMS, October 4-5, 2008 (invited by Alejandro Adem and Steve Mitchell).
- *Refining the Bloch-Kato conjecture*, Poster presentation at BIRS workshop on "New topological contexts for Galois theory and algebraic geometry", March 11, 2008 (invited by Andy Baker and Birgit Richter).
- *A new perspective on groups with periodic cohomology*, Canadian Mathematical Society meeting, Homotopy theory session, London, Ontario Dec. 10, 2007 (invited by Kristine Bauer)
- *Towards a refinement of the Bloch-Kato conjecture*, Canadian Mathematical Society meeting, Homotopy theory session, London, Ontario Dec. 9, 2007 (invited by Kristine Bauer)
- *Finite generation of Tate cohomology and Freyd's generating hypothesis*, AMS special session on Recent advances in Algebraic Topology, Murfreesboro, Tennessee, Nov 3, 2007, (invited by Donald Yau and Mark Johnson).
- *Some new invariants for group algebras*, PIMS algebra summer school in Alberta, University of Alberta, Edmonton, August 7, 2007. (invited by Alejandro Adem, Arturo Pianzola, and Jochen Kuttler).
- *Tate cohomology often fails to detect "null homotopy"*, special session on "*Representation theory and Galois cohomology in Number theory*" at the American Mathematical Society Winter Meeting, Davidson, North Carolina, March 3-4, 2007 (invited by Jan Minac and John Swallow)
- *Which finite  $p$ -groups are like a finite product of fields?* special session on "*Commutative algebra and algebraic geometry*" at the Canadian Mathematical Society Winter Meeting, Toronto, Ontario, Dec. 9-11, 2006 (invited by Ragner Buchweitz).
- *The last conjecture of Frank Adams*, at the semester on Algebraic Topology, Institut Mittag-Leffler, Sweden, April 6th, 2006 (invited by Bjrn Jahren, Kathryn Hess, and Bob Oliver).
- Delivered three lectures on *Thick subcategories in stable homotopy theory – work of Devinatz, Hopkins, and Smith*, Mathematisches Forschungsinstitut Oberwolfach, Germany, February 20-22, 2006 (invited by Henning Krause and Steffan Schwede).
- *A brave new world in homotopy theory*, Graduate Student Topology Conference, Northwestern University, April 9-10, 2005 (invited by Paul Pearson).
- *A Krull-Schmidt theorem for wide subcategories of modules*, session on commutative algebra at the Joint Mathematics meetings, Atlanta, January 5th 2005, (invited by Anurag K. Singh).
- *Stable homotopy over the derived category*, Graduate Student Topology Conference, University of Minnesota, April 24th, 2004 (invited by Jonathan Rogness and James Swenson).

**INVITED TALKS IN COLLOQUIA AND SEMINARS**

- Invited to give a talk in the topology seminar at the University of Regina, Saskatchewan, Canada, Fall 2008, (invited by Don Stanley).
- Some fundamental problems in Tate cohomology, Ganita seminar at the University of Toronto, Mississauga, Canada, May 8, 2008, (invited by Kumar Murthy, Kaneenika Sinha and Kenneth Giuliani).
- *Finite generation of Tate cohomology*, Algebra seminar, University of Western Ontario, April 22, 2008.
- *The unreasonable effectiveness of homotopy theory in algebra and representation theory*, Colloquium, Illinois State University, March 7, 2008.
- *The unreasonable effectiveness of homotopy theory in algebra and representation theory*, Colloquium, Pennsylvania State University, Altoona, February 8, 2008.
- *Stokes Theorem*, Undergraduate seminar, Pennsylvania State University, Altoona, February 7, 2008.
- *An excursion to number theory and combinatorics via Calculus*, Undergraduate Student seminar, Western Washington University, January 24, 2008.
- *The unreasonable effectiveness of homotopy theory in algebra and representation theory*, Colloquium, Western Washington University, January 24, 2008.
- *Towards a refinement of the Bloch-Kato conjecture*, Topology seminar, University of Chicago, January 8th, 2008, (invited by Peter May and Vigleik Angelveit).
- *Freyd's generating hypothesis in modular representation theory*, Topology seminar, University of Rochester, November 16, 2007, (invited by Jonathan Pakianathan).
- *Auslander-Reiten theory for the topologists on the street*, Algebra seminar, University of Western Ontario, October 31 st, 2007.
- *Some new invariants for group algebras*, Algebra seminar, Emory University, Atlanta, August 30, 2007 (invited by Raman Parimala).
- *Diagrammatic methods in representation theory and cohomology*, Graduate student seminar, University of western Ontario, London, July 23rd, 2007.
- *Freyd's generating hypothesis in modular representation theory*, Topology seminar, Johns Hopkins University, March 5th 2007, (invited by Michael Ching).
- *Freyd's generating hypothesis in modular representation theory*, Topology seminar, MIT, Feb 12, 2007, (invited by Haynes Miller).
- *Freyd's generating hypothesis in modular representation theory*, Algebra seminar, Wesleyan University, Feb 9, 2007 (invited by Mark Hovey).
- *Which finite  $p$ -groups are like a finite product of fields?*, Colloquium, Wesleyan University, Feb 7, 2007 (invited by Mark Hovey).
- *Ghosts in modular representation theory*, Algebra seminar, Univ. of Western Ontario, October 2nd, 2006.
- *The generating hypothesis in modular representation theory*, Topology seminar, Wayne State University, August 1st 2006 (invited by Dan Isaksen).
- *Stable homotopy theory – A gateway to modern Mathematics*, Colloquium, Indian Statistical Institute (I.S.I.), India, May 30th 2006 (invited by B. Sury).
- *Stable homotopy theory – A gateway to modern Mathematics*, Colloquium, Indian Institute of Science (I.I.Sc.), India, May 29th 2006 (invited by Govindan Rangarajan).
- *Some applications of the thick subcategory theorem*, Topology seminar, University of Western Ontario, February 8, 2006

- *Rickard's proof of the thick subcategory theorem*, Topology seminar, University of Western Ontario, February 1, 2006.
- *From derived to Quillen equivalence*, Topology seminar, University of Western Ontario, December 14, 2005.
- *Quillen Equivalence implies equivalence in K-theory*, Topology seminar, University of Western Ontario, November 16, 2005.
- *Keller's counter-example to the telescope conjecture*, Algebra seminar, University of Western Ontario, October 4, 2005.
- *A K-theoretic approach for refining the chromatic towers*, Topology Seminar, Northwestern University, April 11, 2005 (invited by Paul Goerss and Paul Pearson).
- *A K-theoretic approach for refining the chromatic towers*, Topology Seminar, University of Illinois at Urbana-Champaign (UIUC), March 1st, 2005 (invited by Donald Yau).
- *Krull-Schmidt decompositions for thick subcategories*, Algebra Seminar, University of Nebraska, February 23, 2005 (invited by Srikanth Iyengar).
- *Subcategories and K-theory for triangulated categories*, Topology seminar, University of British Columbia (UBC), Canada, January 26th 2005 (invited by Alejandro Adem).
- *Triangulated subcategories of finite spectra*, Topology seminar, University of Oregon, November 16, 2004 (invited by Hal Sadofky).
- *Wide subcategories over Noetherian regular rings*, Algebra seminar, University of Washington, October 5, 2004.
- *Krull-Schmidt decompositions for thick subcategories*, Topology Seminar, Univ. of Washington, September 2004.
- *K-theory for thick subcategories of finite spectra*, Topology seminar, University of Washington, April 2004.
- *Stable homotopy theory: A Brave New World*, Current topics seminar, University of Washington, April 15, 2004. item *Subcategories of modules and complexes*, Algebra Seminar, University of Washington, April 13, 2004.

## INVITED PARTICIPANT IN CONFERENCES AND WORKSHOPS

- *Commutative Algebra: Connections with Algebraic Topology and Representation Theory*, University of Nebraska, Lincoln, May 18-22, 2008.
- *Homological Methods in Representation Theory*, MSRI, Berkeley, March 31 - April 4, 2008.
- *New Topological Contexts for Galois Theory and Algebraic Geometry*, BIRS, March 9-14, 2008
- *Introductory Workshop on the Representation Theory of Finite Groups*, MSRI, Berkeley, Feb 4-8, 2008
- *PIMS Algebra Summer School*, University of Alberta, July 30 - August 8, 2007
- *Midwest Topology Conference*, Detroit, Wayne State University, April 28-29, 2007.
- *Complex cobordism in homotopy theory: its impact and prospects*, Johns Hopkins University, March 10-13, 2007.
- *Higher Categories and their applications*, Fields Institute, Toronto, January 9-13, 2007.
- *Midwest Topology Conference*, Bloomington, Indiana University, October 21-22, 2006
- *Workshop on Thick subcategories – Classifications and Applications*, Oberwolfach, Germany, February 19 - 25 2006.

- *Graduate student Topology Conference*, Northwestern University, April 9-10, 2005.
- Workshop on *homotopical localisations and calculus of functors*, Banff International Research Station (BIRS), Canada, April 2-7, 2005.
- *Cascade Topology Seminar*, Oregon State Univ, Corvallis, November 13-14 2004.
- Summer School on the *Interactions between Homotopy Theory and Algebra*, University of Chicago, July 26 - August 6, 2004.
- Workshop on *n-Categories and Foundations*, Institute of Mathematics and its Applications (IMA), Minneapolis, June 7-18, 2004.
- *Graduate student Topology Conference*, University of Minnesota, April 23-25, 2004.
- Fields institute program on *Homotopy theory and its Applications*, London, ON, Canada, September 20-24, 2003.
- *Interactions with Homological Algebra and Representation Theory* - workshop on commutative algebra, Mathematical Sciences Research Institute (MSRI), Berkeley, February 3-7, 2003.

## PROFESSIONAL SERVICE AND MEMBERSHIPS

- Refereed for the following Journals
  - Proceedings of the American Mathematical Society (PAMS)
  - Homology, Homotopy and Applications (HHA)
  - Canadian Journal of Mathematics (CJM)
  - Mathematische Annalen
  - Indian Journal of Mathematics (IJM)
- Reviewer for Mathematical Reviews (MR)
  - MR2353262 (Advances in Mathematics)
  - MR2360144 (Journal of Algebra)
  - MR2361847 (Proc. Amer. Math. Soc)
- Reviewer for Zentralblatt Math.
  - DE052496127 (Journal of pure and applied Algebra)
  - DE05220956X (Geometry and Topology)
- My presentation on Calculus for undergraduates was videotaped for the “Mathematics preparedness program”, by the Faculty of Education and Science, University of Western Ontario, October 2007. Video available at: <http://www.edu.uwo.ca/dwm/rates/index.html>
- Reviewed the text book “Finite Mathematics For the Managerial, Life, and Social Studies,” by S.T. Tan, published by Thomson-Nelson.
- Algebra qualifying examinations committee, University of Western Ontario, Fall 2007.
- Supervision of Putnam Mathematical Competition training sessions with Jan Minac, since Sep. 2007.
- Co-advising (with Jan Minac) Behzad Nikzad (an undergraduate at the University of Western Ontario) since Fall 2006.
- Co-organised (with Georg Biedermann) the topology seminar at the University of Western Ontario, Fall 2005.
- Organised the student algebra seminar at the University of Washington, 2002-2003.
- Regular contributor to local seminars, and informal student seminars in algebra, algebraic topology,  $K$ -theory, representation theory and related fields.
- Note taker for the MSRI workshop on Homological methods in representation theory.

- Trained some graduate students at the University of Western Ontario for algebra qualifying examinations, 2005 – 2008.
- American Mathematical Society, member since 2000.
- Mathematical Association of America, member since 2000.

## PERSONAL DATA

- **Citizen:** India.
- **Date/Place of birth:** May 11, 1978/ Vishakapatnam, India.
- **Marital Status:** Single.
- **Languages:** English, Telugu, Hindi, and Bengali (native-like fluency in all four).
- **US Visa:** B1/B2 multiple entry visa + H1B visa.
- **Canadian Visa:** Permanent resident of Canada since June 2008.

## REFERENCES

- Distinguished Prof. Emeritus. Jon Carlson, University of Georgia, (706) 542-2592, jfc@math.uga.edu
- Prof. Ján Mináč, University of Western Ontario, (519) 661 2111 x86519, minac@uwo.ca
- Prof. John Palmieri, University of Washington, (206) 543-1785, palmieri@math.washington.edu
- Prof. Srikanth Iyengar, University of Nebraska, (402) 472-7241, iyengar@math.unl.edu
- Prof. Henning Krause, Universität Paderborn, (+49) 5251-60-2627, hkrause@math.uni-paderborn.de
- Prof. Dan Christensen, University of Western Ontario, (519) 661-2111 x86530, jdc@uwo.ca
- Prof. Richard Kane, University of Western Ontario, (519) 661-2111 x86522, rkane@uwo.ca (*teaching reference*)