University of California, Los Angeles

GRADUATE Student Copy Transcript Report

Student Information

Name:	BOBKOV, ANTON
UCLA ID:	603557936
Date of Birth:	07/12/XXXX
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Program of Study

Admit Date: 09/19/2011

GRADUATE DIVISION

Major:
MATHEMATICS

Degrees | Certificates Awarded

CANDIDATE IN PHILOSOPHY Awarded June 12, 2015
in MATHEMATICS

Graduate Degree Progress

MATHEMATICS for DOCTOR OF PHILOSOPHY Degree
06/03/2015 Qualifying Oral Exam Passed
06/05/2015 Advanced To Candidacy

Previous Degrees

BACHELOR OF ARTS AND SCIENCE Awarded June 10, 2011 from UCLA
in PHYSICS-BA
in MATHEMATICS
With Departmental Highest Honors Awarded
Magna Cum Laude
With College Honors

Language Exams

11/24/2014 RUSSIAN DEPARTMENTAL EXAM PASSED.

California Residence Status

Resident

Fall Quarter 2011

Major:
MATHEMATICS (PHD)

MATHEMATICAL LOGIC	MATH 220A	4.0	16.0	A+
DESCRIPTVE SET THRY	MATH 223D	4.0	16.0	A
DIFFERENTL TOPOLOGY	MATH 225A	4.0	16.0	A
REAL ANALYSIS	MATH 245A	4.0	9.2	C+

	Atm	Psd	Pts	GPA
Term Total	16.0	16.0	57.2	3.575

Winter Quarter 2012

MATHEMATICAL LOGIC	MATH 220B	4.0	16.0	A
TOPICS-MODEL THEORY	MATH 223M	4.0	16.0	A
DIFFERENTL GEOMETRY	MATH 225B	4.0	16.0	A

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	48.0	4.000

Spring Quarter 2012

ALGEBRAIC TOPOLOGY	MATH 225C	4.0	16.0	A
ALGEBRA	MATH 290C	4.0	0.0	S
DIRECTED INDIV STDY	MATH 596	4.0	16.0	A

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	32.0	4.000

Fall Quarter 2012

COMMUTATIVE ALGEBRA	MATH 215A	4.0	14.8	A-
TCHNG APRNTC PRCTCM	MATH 375	2.0	0.0	S
TCHNG APRNTC PRCTCM	MATH 375	2.0	0.0	S
TEACHG COLLEGE MATH	MATH 495	2.0	0.0	S
DIRECTED INDIV STDY	MATH 596	4.0	16.0	A

	Atm	Psd	Pts	GPA
Term Total	14.0	14.0	30.8	3.850

Winter Quarter 2013

INTR-ALGEBRAIC GEOM	MATH 214A	4.0	16.0	A
TCHNG APRNTC PRCTCM	MATH 375	2.0	0.0	S
TCHNG APRNTC PRCTCM	MATH 375	2.0	0.0	S
DIRECTED INDIV STDY	MATH 596	4.0	16.0	A

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	32.0	4.000

Spring Quarter 2013

INTR-ALGEBRAIC GEOM	MATH 214B	4.0	16.0	A
TCHNG APRNTC PRCTCM	MATH 375	4.0	0.0	S
DIRECTED INDIV STDY	MATH 596	4.0	16.0	A

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	32.0	4.000

Fall Quarter 2013

COMBINATORL THEORY	MATH 206A	4.0	0.0	S
DIRECTED INDIV STDY	MATH 596	8.0	32.0	A

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	32.0	4.000

Winter Quarter 2014

COMBINATORL THEORY	MATH 206B	4.0	0.0	S
DIRECTED INDIV STDY	MATH 596	8.0	32.0	A

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	32.0	4.000

Spring Quarter 2014

LOGIC	MATH 290D	4.0	0.0	S
DIRECTED INDIV STDY	MATH 596	8.0	32.0	A

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	32.0	4.000

Fall Quarter 2014

SEMINAR IN LOGIC	MATH 285D	4.0	16.0	A
DIRECTED INDIV STDY	MATH 596	8.0	0.0	S

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	16.0	4.000

Winter Quarter 2015

TCHNG APRNTC PRCTCM	COMPTNG 375	4.0	0.0	S
DIRECTED INDIV STDY	MATH 596	8.0	0.0	S

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	0.0	0.000

Spring Quarter 2015

Majors:
MATHEMATICS (PHD)
(New) MATHEMATICS (CPH)

TCHNG APRNTC PRCTCM	COMPTNG 375	4.0	0.0	S
DIRECTED INDIV STDY	MATH 596	8.0	0.0	S

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	0.0	0.000

Fall Quarter 2015

TCHNG APRNTC PRCTCM	COMPTNG 375	2.0	0.0	S
SEMINAR IN LOGIC	MATH 285D	4.0	0.0	S
RSRCH IN MATH	MATH 599	6.0	0.0	S

	Atm	Psd	Pts	GPA
Term Total	12.0	12.0	0.0	0.000

Winter Quarter 2016

*** Courses In Progress ***

SEM-COMBINATORICS	MATH 285N	4.0
TCHNG APRNTC PRCTCM	MATH 375	2.0
RSRCH IN MATH	MATH 599	8.0

	Atm	Psd	Pts	GPA
Term Total	0.0	0.0	0.0	0.000

GRADUATE Totals

	Atm	Psd	Pts	GPA
Satisfactory/Unsatisfactory Total	74.0	74.0	N/a	N/a
Graded Total	88.0	88.0	N/a	N/a
Cumulative Total	162.0	162.0	344.0	3.909

Total Completed Units 162.0

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Personal statement

P-adic numbers are a simple, yet a very deep construction. They were only discovered a hundred years ago, but could have been studied in classical mathematics when number theory was just forming. Their construction is simple enough to explain at the undergraduate level, yet has a very rich number theoretic structure. Normally the real numbers are constructed by first taking rational numbers in decimal form and allowing infinite decimal sequences after the decimal point. Letting decimals be infinite before the decimal point yields a well behaved mathematical object as well, but with a drastically different behavior from real numbers, now depending on the base in which the decimals were written. When the base is a prime number p, this constructs p-adic numbers. These were first studied exclusively within number theory, but later found applications in other areas of math, physics, and computer science. My research will allow for a finer understanding of the finite structure of polynomially definable sets in p-adic numbers. In my career as an educator I hope to increase exposure to this elegant and rich construction for students both inside and outside of mathematics.

My research lies in the area of model theory, a branch of formal logic. Model theory began with Godel in 1930, with first major applications by Robinson in 1948 toward Hilbert's 10th problem. Model theory studies sets definable by first order formulas in a variety of mathematical objects. Restricting to subsets definable by simple formulas gives access to an array of powerful techniques such as indiscernible sequences and nonstandard extensions. These allow insights not otherwise accessible by classical methods. Nonstandard real numbers, for example, formalize the notion of infinitesimals. Model theory is an extremely flexible field with applications in many areas of mathematics including algebra, analysis, geometry, number theory, and combinatorics as well as some applications to computer science and quantum mechanics. In my career as a mathematician I hope to expose researchers in other fields to model theoretic methods allowing them to explore alternative approaches to classical mathematical objects.

My research concentrates on the concept of VC-density, a recent notion of rank in NIP theories. Study of a structure in model theory usually starts with quantifier elimination, followed by a finer analysis of definable functions and interpretability. Study of VC-density goes one step further, looking at a structure of the asymptotic growth of finite definable families. In the most geometric examples, VC-density coincides with the natural notion of dimension. However, no geometric structure is required for the definition of VC-density, thus we can get some notion of geometric dimension for families of sets given without any geometric context! In my career as a researcher I hope to further explore this notion and introduce other model theorists to its applications.

To summarize, I intend to follow a career path in academia, balancing my teaching with my research. An important part of being a mathematician is communicating and disseminating mathematical knowledge. I have enjoyed my work as a teaching assistant, and look forward to working with students at all stages of their mathematical education. Another equally important part is developing and progressing mathematical knowledge. My work in model theory has been a great motivation for me, and I plan to stay an active researcher for the rest of my mathematical career.