

Jon Chaika

Born: May 27, 1983
Providence, Rhode Island

Jon Chaika
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Current Position:

Professor	University of Utah	2022-
Associate Professor	University of Utah	2015-2022
Assistant Professor	University of Utah	2013-2015

Past Position:

L.E. Dickson Instructor/NSF Postdoc	University of Chicago	2010-2013
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Education:

Graduate Student in Mathematics	Rice University	2005-2010
Advisor: Michael Boshernitzan		
Thesis: Interval exchange transformations: topological mixing, Hausdorff dimensions for ergodic measures and disjointness		
Ph.D in Mathematics	Rice University	2010
M.A. in Mathematics	Rice University	2007
B.S. in Mathematics	University of Iowa	2001-2005

Interests:

Ergodic theory of interval exchanges, flows on flat surfaces and Teichmüller geodesic flow. Diophantine approximation.

Awards:

Distinguished Research Award	U Utah	2022	\$10,000
Joint invited sectional talk	ICM	2022	
NSF Standard Grant		2021	\$209,453
Simons Fellowship		2020	\$112,016
Poincare Chair	IHP	2017	
Sloan Fellowship			\$50,000
NSF Career grant		2015-	\$447,002
NSF Standard Grant		2013-2015	\$269,944
Warnock Chair	Utah	2012-2018	
NSF Postdoc		2010-2013	\$135,000

CODY Postdoc		2010
Tracy Thomas Award	Rice	2007-2009
Watts Fellowship	Rice	2005

Invited visits:

Simons semester on Dynam. Sys	Banach Center	Spring 2023
Dynamics: Top. and Numbers.	Hausdorff Institute	Spring 2020
Group Actions and numbers	Newton Institute	June 2014
Dynamics and Numbers	Max Planck Institute	July 2014
Mod spaces of Riem surfaces	PCMI	July 2011

Papers:

- 1) *Every transformation is disjoint from almost every IET*. Ann. of Math. 2012 arxiv:0905.2370
- 2) *Diophantine properties of IETs and general systems: quantitative proximality and connectivity* (with M. Boshernitzan). Inventiones 2013 arxiv:0910.5412
- 3) *There exists a topologically mixing IET*. ETDS 2012 arxiv:0910.3986
- 4) *Shrinking targets for IETs: Extending a Theorem of Kurzweil*. GAFA 2011 arxiv: 0910.2694
- 5) *Borel-Cantelli sequences* (with M. Boshernitzan). J. Analyse 2012 arxiv: 0910.5412
- 6) *The distribution of gaps for saddle connection directions* (with J. Athreya). GAFA 2012 arxiv:1012.4298
- 7) *Omega recurrence in cocycles* (with D. Ralston). ETDS 2014. arxiv:1109.2999
- 8) *Schrödinger Operators defined by interval exchange transformation* (with D. Damanik and H. Krüger). Journal of Modern Dynamics 2009 arxiv:08093230
- 9) *Hausdorff dimension for ergodic measures of interval exchange transformations*. Journal of Modern Dynamics 2008 arxiv:0807.2231
- 10) *Skew products over rotations with exotic properties*. Geo. Ded. 2014 arxiv:1105.3633
- 11) *Winning games for bounded geodesics in the moduli space of quadratic differentials* (with Y. Cheung and H. Masur). Journal of Modern Dynamics 2013 arxiv:1109.5976
- 12) *Every transformation is disjoint from almost every non-classical exchange* (with V. Gadre). Geo. Ded. 2014 arxiv: 1110.2474
- 13) *Topological mixing for some residual sets or interval exchange transformations* (with J. Fickenscher) Comm. Math. Phys 2015 arxiv:1304.8127
- 14) *The gap distribution of slopes of the golden L*. (with J. Athreya and S. Lelievre) Contemp Math 631 arxiv:1308.42.03
- 15) *The Hausdorff dimension of non-uniquely ergodic direction in $H(2)$ is almost everywhere $1/2$* (with J. Athreya) Geom. & Top 2015. arxiv:1404.4657
- 16) *Every flat surface is Birkhoff and Oseledets generic in almost every direction* (with A. Eskin) Journal of Modern Dynamics 2015 arxiv:1304.8127
- 17) *There exists an interval exchange with a non-ergodic generic measure*. (with H. Masur). Journal of Modern Dynamics 2015 arxiv:14010.1576

- 18) *On the limit set in PMF of Teichmüller geodesics.* (with H. Masur and M. Wolf) Crelle's Journal 2019 arxiv:1406.0564.
- 19) Appendix C of *Right-angled billiards and volumes of moduli space of quadratic differentials on CP^1 .* (Paper by J. Athreya, A. Eskin and A. Zorich) Annales ENS 2016 arxiv: 1212.1660
- 20) *A dichotomy for the stability of arithmetic progressions* (with M. Boshernitzan) Proceedings AMS 2016 arxiv:1303.4684
- 21) *Circle averages and disjointness in typical flat surfaces on every Teichmueller disc* (with P. Hubert). Bulletin of the London Mathematical Society 2017 arxiv:1510.05955
- 22) *The set of uniquely ergodic IETs is path connected* (with S. Hensel) Ergodic Theory and Dynamical Systems 2019 arxiv:1405.0767
- 23) *Quantitative shrinking target properties for rotations interval exchanges and billiards in rational polygons.* (with D. Constantine) Israel Journal of Mathematics 2019. arxiv:1201.0941
- 24) *A smooth mixing flow on a surface with non-degenerate fixed points.* (with A. Wright) Journal of the AMS 2019. arxiv:1501.02881
- 25) *Logarithmic laws and unique ergodicity.* (with R. Trevino) Journal of Modern dynamics 2017 arxiv:1603.00076
- 26) *Horocycle flow orbits and lattice surface characterizations* (with K. Lindsey). Ergodic Theory and Dynamical System 2019 arxiv:1508.02801
- 27) *Ergodicity of skew products over linearly recurrent IETs* (with D. Robertson). Journal of the LMS 2019. arxiv:1709.01575
- 28) *Mobius disjointness for interval exchange transformations on 3 intervals* (with A. Eskin) Journal of Modern Dynamics 2019 arxiv.org/pdf/1606.02357.pdf
- 29) *Self-joinings for 3-IETs* (with A. Eskin) Accepted Journal of EMS.
- 30) *Uniform distribution of saddle connection lengths* (with D. Robertson) Journal of Modern Dynamics 2019
- 31) *Stationary coalescing walks on the lattice* (with A. Krishnan) Probability and related fields (2019).
- 32) *The set of non-uniquely ergodic d -IETs has Hausdorff codimension $1/2$* (with H. Masur). Inventiones Mathematicae 2020. arxiv:1801.00770
- 33) *Singularity of the spectrum for smooth area preserving flows in genus two and translation surfaces well approximated by cylinders.* (with K. Fraczek, A. Kanigowski and C. Ulcigrai) Communications in Mathematical Physics (2021). arxiv:1912.10250
- 34) *A prime system with many self-joinings* (with B. Kra). Journal of Modern Dynamics (2021) arxiv:1902.02421
- 35) *Zero measure spectrum for Mult-Frequency Schrodinger operators* (with D. Damanik, J. Fillman and P. Gohlke) Journal of Spectral Theory to appear <https://arxiv.org/abs/2009.11946>
- 36) *Connectivity of the Gromov boundary of the free factor complex* (with M. Bestvina and S. Hensel) Accepted Annales Henri Lebesgue <https://arxiv.org/pdf/2105.01537.pdf>
- 37) *On the space of ergodic measures for the horocycle flow on strata of abelian*

differentials (with O. Khalil and J. Smillie) Accepted Annales ENS <https://arxiv.org/pdf/2104.00554.pdf>

38) Appendix to *Pairs in discrete lattice orbits with applications to Veech surfaces*. Paper by (C. Burrin and S. Fairchild) Accepted Journal of EMS <https://arxiv.org/abs/2211.14621>

39) *The typical measure preserving transformation is not an interval exchange transformation* (with D. Davis). Submitted arxiv:1812.10425

40) *Weakly mixing polygonal billiards* (with G. Forni). Submitted arxiv:2003.00890

41) *Tremors and horocycle dynamics on the moduli space of translation surfaces* (with J. Smillie and B. Weiss). Submitted <https://arxiv.org/pdf/2004.04027.pdf>

42) *Path connectivity of the sets of uniquely ergodic and cobounded foliations* (with S. Hensel) Submitted arxiv:1909.03668

43) *Shrinking rates of horizontal gaps for generic translation surfaces* (with S. Fairchild) Submitted <https://arxiv.org/pdf/2207.03836.pdf>

44) *Horocycle dynamics in rank one invariant sub varieties I: weak measure classification and equidistribution*. (with B. Weiss and F. Ygouf) Submitted arxiv:2301.12419

45) *On the ergodic theory of the real Rel foliation*. (with B. Weiss) Submitted arxiv:2301.02483

46) *Ergodic multidimensional continued fraction algorithms*. (with A. Nogueira) arxiv:1302.5008

47) *Stationary coalescing walks on the lattice II: Entropy* (with A. Krishnan) Submitted arxiv:1909.04816.pdf

48) *The Densest Sequence in the Unit Circle* (with M. Boshernitzan). Preprint arxiv:0906.0045

49) *Towers of powers* (with M. Boshernitzan). Preprint

50) *On the Hausdorff dimensions of a singular ergodic measure for some interval exchange transformations*. Preprint arxiv: 1105.3633

51) *On the frequency of balanced times in cylinder flows* (with D. Ralston). Preprint arxiv:0908.4547

52) *Homogeneous approximation for flows on flat surfaces*. Preprint arxiv: 1110.6167

53) *$[0,1]$ is not a minimality detector for $[0,1]^2$* . Preprint arxiv:0905.4276

54) *On the Minkowski diagonal function for two real numbers*. (with I. Kan and N. Moshchevitin) Diophantine analysis and related fields 2011

Papers stemming from undergraduate research:

a) *A theorem on accepted elasticity in certain local arithmetical congruence monoids*. (with M. Banister, S. Chapman and W. Meyerson). Abh. Math. Semin. Univ. Hambg. 2009.

b) *On a result of James and Niven concerning unique factorization*. (with M. Banister, S. Chapman and W. Meyerson). Elem. Math. 2007

c) *On the arithmetic of arithmetical congruence monoids*. (with M. Banister, S. Chapman and W. Meyerson). Colloq. Math. 2007

Grants not listed under awards: (all awarded for conferences with co-organizers)

Major Thematic Program at the Fields Institute \$350,000 CAD from Fields +\$50,000 USD from NSF

Wasatch topology 2 grants totaling \$82,545

Rocky mountain dynamics conference \$24,000

Service At Utah:

Co-organized math part of ACCESS course the past 5 years (a signature program of the college of sciences at Utah, over the summer largely for incoming undergraduate women in STEM. I taught a mini-course on fractals, organized speakers, etc.), Organized qualifying exams, Ad Hoc committee to revamp early graduate program, Graduate recruitment committee, Putnam committee (National math competition-organized weekly problem sessions), Hiring committee, Undergraduate committee, Graduate admissions committee, instructorship committee, Graduate student faculty representative, Co-organizer of Max Dehn seminar (local research seminar), organized local working seminars, course coordinator 2270-80, Chair of Ad-hoc RPT committee, Organized RTG conferences.

Profession:

Organized a research community in Teichmuller dynamics Jan 2023, Co-organized Semester long program in Fields Institute 2018 (organized a summer school, research conference, taught a class, mentored two postdocs, found funding for SAGE days), MRC Snowbird 2017 (week long research community where I suggested problems to two groups of students, one leading to a paper accepted in the Journal of the European Math Society), Wasatch topology conference, AMS Special session Salt Lake City, UT 2016, Rocky mountain dynamical systems conference, 2013 AMS special session in Ames, IA, CIRM conference on Teich space billiards and IETs in 2017, Co-organized a memorial conference for Boshernitzan, One week mentoring of Summer research cluster, Taught a summer school in Bologna Spring 2022, Taught mini-course in 3rd Houston summer school on dynamical systems, Taught a minicourse 2018 Hamilton conference on Ratner's theorems, Taught weeklong course at Hausdorff Institute winter school, Taught a mini course for Simons semester at the Banach Center in May 2023, organizing online learning seminar, Refereeing, NSF Panels each of the past 4 years (and 2 other years), AMS MRC committee and AMS Simons-Simons Travel Grants Committee

Mentoring:

Postdoctoral: Mishel Skenderi (currently a postdoc at Utah)

Osama Khalil (TT at UIC)

Ioannis Konstantuolas (currently researcher in Uppsala)

Donald Robertson (Lecturer at Manchester)

Graduate: Minhua Chen joint with Sean Howe (passed oral exam)

Yibo Zhai (passed oral exam)

Carlos Ospina (passed oral exam)

Rebekah Eichberg (PhD 2022)

Matt Smith (PhD 2020)

Leonard Carapezza (PhD Summer 2018)

Sauditya Jaiswal (undergraduate at IIS 2021-present)
Mackenzie Simper (undergraduate research Spring 2016)
Rebecca Hardenbrook (undergraduate research Fall 2017)

Invited Talks:

Recent progress on the horocycle flow on strata of translation of translation surfaces
U Chicago Dynam Fall 2023

Recent progress on the horocycle flow on strata of translation of translation surfaces
UIC Colloquium Fall 2023

Recent progress on the horocycle flow on strata of translation of translation surfaces
ICTP Fall 2023

Horocycle orbit closures in rank 1 loci are nice Journee de Dynamics Fall 2023

There exists a weakly mixing billiard in a polygon Northwestern Colloquium Fall 2023

There exists a weakly mixing billiard in a polygon Flat Seminar Paris Summer 2023

There exists a weakly mixing billiard in a polygon UC Riverside dynamics seminar Spring 2023

There exists a weakly mixing billiard in a polygon Indiana Colloquium Fall 2022

On the ergodicity of Rel w.r.t Masur-Veech measure CIRM Fall 2022

The set of new IETs has codimension 1/2 Lorentz Center Summer 2022

On the ergodicity of Rel w.r.t Masur-Veech measure Mostly Dynam virtual ICM Summer 2022

Translation surfaces and their connections U Houston Colloquium Spring 2021

A strange limit of hor. erg. meas. in a stratum of trans. surf. Clemson Analysis 2021

A strange limit of hor. erg. meas. in a stratum of trans. surf. Texas Geom & Dynam. sem. Fall 2021

Translation surfaces and their connections Tata Inst Random. Geometry Colloquium Fall 2021

The Gromov boundary of the free factor graph is path connected Summer Surf. Summer 2021

A strange limit of hor. erg. meas. in a stratum of trans. surf. Wisconsin Dynam. sem. Spring 2021

There exists a weakly mixing billiard in a polygon Oklahoma Dynam sys working seminar Fall 2020

There exists a weakly mixing billiard in a polygon Warwick dynamics seminar Spring 2020

There exists a weakly mixing billiard in a polygon. Horowitz seminar Tel Aviv Jan. 2020

A prime system with many and big self joinings UT Austin dynam sem Fall 2019

A prime system with many and big self joinings Maryland Dynamics sem Fall 2019

Horocycle orbits on strata of trans. surf. Oberwolfach Summer 2019

A prime system with many and big self joinings Parabolic dynam Summer 2019

Horocycle orbits on strata of trans. surf. Lemanczyk conf Bedlewo Summer 2018

Horocycle orbits on strata of trans. surf. Mirzakhani memorial Stanford Spring 2018

Horocycle orbits on strata of trans. surf. Dynam. Sem. Northwestern Spring 2018

Horocycle orbits on strata of trans. surf. AMS sec. Vanderbilt Spring 2018
Almost every 3-IET is not simple Maryland dynam conf. Spring 2018
Horocycle orbits on strata of trans. surf. Warwick Spring 2018
The horocycle flow on strata of trans surf Pingree park. Summer 2017
Almost every 3-IET is not simple. Math Cong of Am Summer 2017
Almost every 3-IET is not simple. Lille Spring 2017
Almost every 3-IET is not simple. Torun Spring 2017
Cobounded foliations are a path connected subest of PMF Bordeaux. Spring 2017
Cobnded fol are a path connected. Seminaire Geometrie IHES Winter 2017
Almost every 3-IET is not simple. Seminaire Dynamique. Winter 2017
Hausdorff dim of not uniquely erg. IETs. Flat Seminar IHP Winter 2017
Disjointness for 3-IETs colloquium Rouen Winter 2017
Hausdorff dim of not uniquely erg. IETs Geom and dynam of mod sp IHP Winter 2017
Hausdorff dim of not uniquely erg. IETs Penn State dynam. conf Fall 2016
Disjointness for 3-IETs Prob meth in dynam and app CRN Montreal Fall 2016
Masur's log laws and unique erg. Flat surf & dynam on mod CMO Summer 2016
Hdim and new for IETs Erg, lag & comb methods in dim th ICERM Spring 2016
Masur's log laws and unique erg. Dynam seminar U Chicago Winter 2016
Isom. and disj. for IETs and flows on flat surf TexAMPS Fall 2015
A mixing C infinity on a surf w/ only non-degen. saddles MWDS Fall 2015
Isom. and disj. for IETs and flows on flat surf CIRM Summer 2015
Isom. and disj. for IETs and flows on flat surf Stanford informal geom-top Fall 2014
Isomorphism and disjointness for IETs and flows on flat surfaces Ahlfor-Bers Fall 2014
Non-uniquely ergodic IETs Number theory seminar OSU Fall 2014
Isomorphism and disjointness for IETs and flows on flat surfaces OSU Colloq Fall 2014
Non-uniquely ergodic IETs BYU Colloquium
Non-Uniquely ergodic IETs Utah GSAC
The set of uniquely ergodic 4-IETs is path connected Wasatch Top. Summer 2014
A mixing C infinity on a surf w/ only non-degen. saddles Dynam & Numb Summer 2014
Minimal and not uniquely ergodic IETs GAN Conference Summer 2014
A mixing loc. Hamil. flow on a surf w/ only non-degen. saddles UC geom/top Spring 2014
Diophantine approximation for IETs U Denver Analysis seminar Spring 2014
The limit of some Teich. geodesics in PMF Comp. dynamo sem CUNY Spring 2014
The set of uniquely ergodic 4 (or more)-IETs is path connected Rice Dynamics meeting
The set of uniquely ergodic 4 (or more)-IETs is path connected Oberwolfach Spring 2014
Minimal and not uniquely ergodic IETs ICERM Fall 2013
Minimal and not uniquely ergodic IETs Penn State dynamics conf Fall 2013
Minimal and not uniquely ergodic IETs Max Dehn seminar Fall 2013

Some results that hold on every flat surface Texas ergodic theory seminar Fall 2013
The limit of some Teich. geodesics in PMF BYU Topology seminar Fall 2013
Interval exchange transformations Univ. North Texas Colloquium Spring 2013
The set of not uniquely ergodic 4-IETs has Hdim $5/2$ AMS Boulder Sectional Spring 2013
Badly approximable directions on a flat surface AMS Boulder Sectional Spring 2013
Some results that hold on every flat surface OSU ergodic theory seminar Spring 2013
Some results that hold on every flat surface Maryland dynamics conference Spring 2013
Some results that hold on every flat surface Yale Dynam. of grp actions Winter 2013
Quantitative shrinking targets Actions on param. spaces Sde Boker Winter 2013
Quantitative shrinking targets Wasatch Topology Conf. Fall 2012
Badly approx. directions on flat surfaces and PMF Princ. erg th & stat mech Spring 2012
Quantitative shrinking targets Bloomington Geometry Workshop Spring 2012
Minimal and not uniquely ergodic IETs EIU Geom, Top & Dyn Day Spring 2012
Interval exchange transformations UIUC Colloquium Winter 2012
Badly approximable directions on flat surface Utah Max Dehn Seminar Winter 2012
Interval exchange transformations Utah Colloquium Winter 2012
Interval exchange transformations Toronto Colloquium Winter 2012
Badly approximable directions on flat surfaces Harvard Informal Dyn. sem. Fall 2011
Interval exchange transformations UIC colloquim Fall 2011
Interval exchange transformations Northwestern Dynamics seminar Fall 2011
Ergodicity of some skew products of IETs Cornell Dynamics seminar Fall 2011
Badly approximable directions on flat surfaces UIUC Erg theory seminar Fall 2011
Quantitative shrinking targets Seminaire Ernest Marseilles Summer 2011
On non-uniquely ergodic IETs Oberwolfach Spring 2011
Quantitative shrinking targets for IETs AMS Sectional Meeting Las Vegas Spring 2010
Gaps in saddle connection directions Maryland dynamics conference Spring 2010
Some Diophantine properties of IETs UIC Top, Geom, Dynam seminar Winter 2010
An introduction to IETs U Chicago Geom and Top seminar Winter 2010
Non-uniquely ergodic IETs Northwestern Dynamics seminar Fall 2010
Some skew products with exotic properties UIUC Groups seminar
Some skew products with exotic properties Pingree park Dynam. Sys Workshop Summer 2010
Some diophantine properties of IETs Syst. Dynam.: Espaces de pavages Summer 2010
Diophantine properties of IETs Hausdorff Institute Main Conference Summer 2010
Almost every pair of IETs is disjoint Seminaire ergodic Paris Summer 2010
Almost every pair of IETs is disjoint Teich seminar Marseilles Summer 2010

A Residual set of 4-IETS is Topologically Mixing Sem. Ernest Marseilles Spring 2010

Interval Exchange Transformations Dept. Colloq. U of Toronto Spring 2010

Diophantine properties of Interval Exchange Transformations and general systems Math Phys. Sem. U of Texas Spring 2010

Every Transformation is disjoint from almost every IET Workshop in dyn. sys. Penn St. Fall 2009

Universal Minimality Detectors Penn State, MASS colloq. Fall 2009

Shrinking Targets for IETs and Sequences Brandeis, Everytopic sem. Fall 2009

An introduction to IETs Brandeis, New dir. sem. Fall 2009

Every Transformation is disjoint from almost every IET Yale, Grp. act. sem Fall 2009

Shrinking Targets for IETs and Sequences Rice, Geom. & anal. seminar Fall 2009

Borel Cantelli Sequences Jena, Ger. frac. Geo. & stoch. sem. Summer 2009

Almost every pair of IETs is disjoint Texas A&M Grp. & Dyn. Spring 2008

Borel Cantelli Sequences Penn State, Cent. for geo. & dyn. Sem. Spring 2008

Borel Cantelli Sequences U of Houston, Dyn. & erg. th. sem. Spring 2008

Shrinking Targets and Related Properties Ohio State, Erg. th. & prob. sem. Spring 2008

Schrödinger Operators Defined by IETs Rice U, Geo & anal. sem. Fall 2008

Hausdorff Dimensions of Ergodic Measures of IETs U of Houston Summer 2008

Hausdorff Dimensions of Ergodic Measures of IETs Marseilles, France Summer 2008

Universal Ranges for Minimal Sequences Luminy, Fr. Sem. Ernest Summer 2008

Hausdorff Dimensions of Ergodic Measures of IETs, Rice U, Erg. th. sem., Spring 2007

Teaching Experience:

Calculus I	Univ. Utah	Spring 2023
Topics in Geometry Topology	Univ. Utah	Fall 2022
Real analysis	Univ. Utah	Fall 2022
Linear algebra sections)	Univ. Utah	Spring 2022 (2
Real analysis	Univ. Utah	Fall 2021
Complex analysis	Univ. Utah	Spring 2021
Topics in Geometry Topology	Univ. Utah	Fall 2019
Linear Algebra	Univ. Utah	Spring 2019
Complex Analysis	Univ. Utah	Spring 2019
Dynam and conn to Teich th	Fields Institute.	Fall 2018
Complex Analysis	Univ. Utah	Spring 2018
Topics in Geometry Topology	Univ. Utah	Spring 2018
Linear Algebra	Univ. Utah	Fall 2017
Real Analysis	Univ. Utah	Fall 2016
Topics in Geometry Topology	Univ. Utah	Fall 2015
Real Analysis	Univ. Utah	Fall 2015
Topics in Geometry-Topology	Univ. Utah	Spring 2014
Complex Analysis	Univ. Utah	Spring 2015

Foundations of analysis	Univ. Utah	Fall 2014
Real Analysis	Univ. Utah	Fall 2014
Undergrad problems Seminar	Univ. Utah	Fall 2014
Topics in Geometry-Topology	Univ. Utah	Spring 2014
Real Analysis	Univ. Utah	Fall 2013
Accelerated Analysis	Univ. Chicago	Spring 2012
Accelerated Analysis	Univ. Chicago	Fall 2011
Differential Eq. (for Bio. & Chem.)	Univ. Chicago	Spring 2011
Multivariable Calc. (for Bio. & Chem.)	Univ. Chicago	Winter 2010
Calculus III	Rice University	Summer 2008
Differential Equations	Rice University	Fall 2007
Introduction to Hardy Fields	Rice University	Spring 2007
Calculus I	Rice University	Summer 2006