Vasileios Chousionis

Curriculum Vitae

Education

2008 **PhD**, *University of Helsinki*, Mathematics.
Thesis Advisor: Pertti Mattila

2003 **BS**, *University of Athens*, Greece, Mathematics.

Research Interests

Geometric Measure Theory, Harmonic Analysis, Dynamical Systems, Potential Theory, Analysis on Metric Spaces.

Employment

2019- **Associate Professor**, *University of Connecticut*.

2015-2019 **Assistant Professor**, *University of Connecticut*.

2014-2015 **Finnish Academy Postdoctoral Researcher**, *University of Helsinki*.

2012-2014 **Visiting Assistant Professor**, *University of Illinois at Urbana-Champaign*.

2011-2012 **Postdoctoral Researcher**, *Universitat Autonoma de Barcelona*.

2009-2011 **Postdoctoral Researcher**, *University of Helsinki*.

Spring 2009 **Invited Research Member**, *Centre de Recerca Matematica*, Barcelona.

Research Grants

2018-2019 **National Science Foundation Conference Grant**, *25,000 dollars*.
Project Title: Dynamics, Measures and Dimensions conference in Bedlewo, Poland, April 2019.

2017-2022 **Simons Foundation Collaboration Grant**, *42,000 dollars*.
Project Title: Analysis and Dynamics on Carnot groups.

2013-2016 **Finnish Academy Postdoctoral Grant**, *297,846 euros*.
Project Title: Geometric Harmonic Analysis.

2009-2011 **Finnish Centre of Excellence in Dynamics Travel Grant**, *15,000 euros*.

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Publications

30. **The strong geometric lemma for intrinsic Lipschitz graphs in Heisenberg groups**, *with S. Li and R. Young*.
J. Reine Angew. Math. to appear.

29. **Singular integrals on $C^{1,\alpha}$ regular curves in Carnot groups**, *with S. Li and S. Zimmerman*.
J. Analyse Math. to appear.

28. **Porosity in conformal dynamical systems**, *with M. Urbański*.
Math. Proc. Cambridge Philos. Soc. to appear.

27. **On uniform measures in the Heisenberg group**, *with V. Magnani and J.Tyson*.
Adv. Math. 363 (2020), 106980

26. **Bi-Lipschitz embeddings of Heisenberg submanifolds into Euclidean spaces.**, *with S. Li, S. Zimmerman and V. Vellis*.
Ann. Acad. Sci. Fenn. Math. 45 (2020), no. 2, 931–955

25. **On the dimension spectrum of infinite subsystems of continued fractions**, *with D. Leykekhman and M. Urbański*.
Trans. Amer. Math. Soc. 373 (2020), no. 2, 1009–1042.

24. **Boundedness of singular integrals on $C^{1,\alpha}$ intrinsic graphs in the Heisenberg group**, *with K. Fässler and T. Orponen*.
Adv. Math. 354 (2019), 106745, 45 pp.

23. **Conformal graph directed Markov systems on Carnot groups**, *with J. Tyson and M. Urbański*.
Mem. Amer. Math. Soc. 266 (2020), no. 1291

22. **The dimension spectrum of graph directed Markov systems**, *with D. Leykekhman and M. Urbański*.
Selecta Math. 25 (2019), no. 3, Art. 40

21. **The traveling salesman theorem on Carnot groups**, *with S. Li and S. Zimmerman*.
Calc. Var. Partial Differential Equations 58 (2019), no. 1, Art. 14, 35 pp.

20. **Intrinsic Lipschitz graphs and vertical β-numbers in the Heisenberg group**, *with K. Fässler and T. Orponen*.
Amer. J. Math. 141 (2019), no. 4, 1087–1147.

19. **Nonnegative kernels and rectifiability in the Heisenberg group**, *with S. Li*.
Anal. PDE, 10–6 (2017), 1407–1428.

18. **Some Calderón-Zygmund kernels and their relation to rectifiability and Wolff capacities**, *with L. Prat*.
Math. Z. 282 (2016) no. 1-2, 435–460.

17. **Square Functions of Fractional Homogeneity and Wolff Potentials**, *with L. Prat and X. Tolsa*.
Int. Math. Res. Not. no.9 (2016), 2295–2319.

16. **Square functions and uniform rectifiability**, *with J. B. Garnett, T. Le and X. Tolsa*.
Trans. Amer. Math. Soc. 368 (2016), no. 8, 6063–6102.

15. **Removable sets for homogeneous linear PDE in Carnot groups**, *with J.Tyson*.
J. Analyse Math. 127 (2016), 215–238.

14. **Marstrand's density theorem in the Heisenberg group**, *with J.Tyson*.
Bull. London Math. Soc. 47 (2015), no. 5, 771–788.

13. **Removable sets for Lipschitz harmonic functions on Carnot groups**, *with V. Magnani and J.Tyson*.
Calc. Var. PDE. 53 no. 3-4 (2015) 755–780.

12. **Fractal solutions of dispersive PDE**, *with M. B. Erdoğan and N. Tzirakis*.
Proc. Lond. Math. Soc. (2015) 110 (3): 543–564.

11. **A note on weak convergence of singular integrals in metric spaces**, *with M. Urbański*.
Math. Res. Lett. Volume 22, No. 01, (2015) 11–21.

10. **Homogeneous kernels and self-similar sets**, *with M. Urbański*.
Indiana Univ. Math. J. 64 No. 2 (2015), 411–431.

9. **Weak and strong estimates for singular integrals of measures separated by AD-regular boundaries**, *with X. Tolsa*.
Int. Math. Res. Not. 23 (2014), 6497–6522.

8. **Singular integrals on self-similar sets of metric groups**, *with P. Mattila*.
Proc. Conf. "Further Developments in Fractals and Related Fields", in "Trends in Mathematics" of Birkhauser (2014).

7. **Singular integrals on self-similar sets and removability for Lipschitz harmonic functions in Heisenberg groups**, *with P. Mattila*.
J. Reine Angew. Math. 691 (2014), 29–60.

6. **Capacities associated to Calderón-Zygmund kernels**, *with J. Mateu, L. Prat and X. Tolsa*.
Potential Anal. 38 (2013), no. 3, 913–949.

5. **Calderón-Zygmund kernels and rectifiability in the plane**, *with J. Mateu, L. Prat and X. Tolsa*.
Adv. Math., 231:1 (2012), 535–568.

4. **Singular integrals on Ahlfors-David regular subsets of the Heisenberg group**, *with P. Mattila*.
J. Geom. Anal. 21 (2011), no. 1 , 56–77.

3. **Singular integrals of general measures separated by Lipschitz graphs**, *with P. Mattila*.
Bull. London Math. Soc. 42 (2010), no. 1, 109-118.

2. **Directed porosity on conformal iterated function systems and weak convergence of singular integrals**.
Ann. Acad. Sci. Fenn. Math. 34 (2009), 215-232.

1. **Singular integrals on Sierpinski gaskets**.
Publ. Mat. 53 (2009), no. 1, 245–256.

Invited Talks

April 2021	University of Crete, Virtual Geometry Seminar.
January 2020	Brown University, Analysis Seminar.
January 2020	Plenary speaker at the workshop "Harmonic Analysis and Applications", Yau Mathematical Sciences Center, Sanya, China.
April 2019	Plenary speaker at the conference "Dynamics, Measures and Dimensions", Bedlewo, Poland.
October 2018	Invited speaker at the Sectional AMS Mathematic Meeting, San Francisco, CA, Special session in Statistical and Geometrical Properties of Dynamical Systems.
August 2018	SUMRY Undergraduate Colloquium, Yale University.
April 2018	Invited speaker at the Sectional AMS Mathematic Meeting, Boston, MA, Special session in Analysis and Geometry on Non-smooth Spaces.
March 2018	Chinese University of Hong Kong, Analysis seminar.
Sept 2017	Invited speaker at the Sectional AMS Mathematic Meeting, Denton, TX, Special session in Dynamical Systems and Number Theory.
July 2017	Invited speaker at the workshop "Geometric Measure Theory", Warwick University, UK.
April 2017	Yale University, Analysis Seminar.
March 2017	Invited speaker at the conference "Analysis on Metric spaces", University of Pittsburgh.
March 2017	Worcester Polytechnic Institute, Analysis Seminar.
Oct 2016	Stony Brook University, Analysis seminar.
May 2016	Invited speaker at the conference "Contemporary Algebra and Geometry", Crete, Greece.
April 2016	Worcester Polytechnic Institute, Colloquium Lecture.
March 2016	Invited speaker at the Sectional AMS Mathematic Meeting, Stony Brook, Special session in Geometric Measure Theory and related fields.
Jan 2016	University of North Texas, Millican Colloquium Lecture.
Jan 2016	Invited speaker at the Joint AMS-MAA Mathematics Meeting, Seattle Special session in Analysis and Geometry in Nonsmooth Metric Measure Spaces.
Jan 2015	Invited speaker at the MaNET Workshop "Sub-Riemannian Analysis, PDE and Applications", Bern, Switzerland.
Oct 2014	University of North Texas, Millican Colloquium Lecture.
Oct 2014	University of Illinois at Urbana-Champaign, Analysis Seminar.
June 2014	Invited speaker at the First Joint International Meeting RSME-SCM-SEMA-SIMAI-UMI, Bilbao, Spain.
Feb 2014	University of Connecticut, Colloquium Lecture.
Jan 2014	Kansas State University, Colloquium Lecture.
Jan 2014	Invited speaker at the Finnish Mathematical Days 2014, Helsinki.

Nov 2013	Indiana University, Analysis Seminar.
Oct 2013	Invited speaker at the AMS sectional meeting, St. Louis, Special session in Interactions between geometric and harmonic analysis.
Aug 2013	Invited speaker at the XXII Rolf Nevanlinna Colloquium 2013, Helsinki.
Jan 2013	Barcelona Analysis Seminar.
Sept 2012	University of Illinois at Urbana-Champaign, Analysis Seminar.
June 2012	Contributed talk in the "9th International Conference on Harmonic analysis and PDE's", El Escorial, Spain.
May 2012	University of Bilbao, Analysis Seminar.
March 2012	University of North Texas, Millican Colloquium Lecture.
Dec 2011	University of Helsinki, Functional Analysis Seminar.
Oct 2011	Barcelona Analysis Seminar.
June 2011	Universitat Autonoma de Madrid, Analysis Seminar.
Nov 2010	Barcelona Analysis Seminar.
Oct 2010	University of Thessaloniki, Analysis Seminar.
March 2010	University of Helsinki, Geometric Analysis Seminar.
Jan 2010	Invited speaker at the Finnish Mathematical Days 2010, Jyväskylä.
March 2009	Centre de Recerca Matematica (Barcelona), Harmonic analysis seminar.
Sept 2008	Contributed talk in the International conference "Fractal Geometry and Stochastics 4", Greifswald, Germany.
March 2008	University of Helsinki, Functional Analysis Seminar.
Oct 2006	Invited Speaker at the "Helsinki-Jyväskylä Geometric Measure Theory Workshop", University of Jyväskylä.

Professional Activities

- Organizer of the AMS Special Session in Metric Techniques in Analysis. Spring Virtual Eastern Sectional Meeting. March 2021 (with S. Li).
- Member of the Organizing and Scientific committee for the International conference "Dynamics, Measures and Dimension", Bedlewo, Poland. April 2019.
- Organizer of the International conference "Geometric Measure Theory and its connections", Helsinki, Finland. June 2018 (with D. Bate, K. Fassler, T. Orponen).
- Organizer of the AMS Special Session in Geometric Aspects of Harmonic Analysis. Fall Eastern Sectional Meeting. Brunswick, Maine. Sept 2016 (with M. Badger).
- Organizer of the UConn Special Semester in Nonsmooth Analysis. Fall 2015. (with M. Badger, M. Gordina, L. Rogers, and A. Teplyaev).

- Referee for the journals:
  - Proc. London Math. Soc.
  - Trans. Amer. Math. Soc.
  - Rev. Mat. Iberoam.
  - Ann. Acad. Sci. Fenn. Math.
  - Proc. Amer. Math. Soc.
  - Ergod. Theor. Dyn. Syst.
  - J. Funct. Anal.
  - Int. Math. Res. Not.
  - J. Geom. Anal.
  - J. Fractal Geom.
  - J. London Math. Soc.

Teaching Experience

University of Connecticut

- **Graduate Courses**
  - Math 5130 *Functional Analysis* **Fall 2021**
  - Math 5010 *Singular Integrals and Applications* **Spring 2021**
  - Math 5111 *Measure and Integration* **Spring 2021**
  - Math 5121 *Ergodic Theory and Conformal Dynamics* **Fall 2020**
  - Math 5111 *Measure and Integration* **Spring 2019**
  - Math 5130 *Functional Analysis* **Fall 2017**
  - Math 5141 *Modern Harmonic Analysis* **Spring 2017**
  - Math 5140 *Fourier Analysis* **Fall 2016**
  - Math 5111 *Measure and Integration* **Spring 2016**
- **Undergraduate Courses**
  - Math 2710 *Transition to Advanced Mathematics* **Fall 2020**
  - Math 2710W *Transition to Advanced Mathematics* **Spring 2020**
  - Math 3094 *Fourier Analysis and Applications* **Spring 2019**
  - Math 3150 *Analysis I* **Fall 2018**
  - Math 2710 *Transition to Advanced Mathematics* **Spring 2018**
  - Math 2710 *Transition to Advanced Mathematics* **Fall 2017**
  - Math 2710 *Transition to Advanced Mathematics* **Fall 2016**
  - Math 3150 *Analysis I* **Fall 2015**

University of Illinois at Urbana-Champaign

- **Undergraduate Courses**
  - Math 448 *Complex Variables* **Fall 2013**
  - Math 285 *Intro to Differential Equations* **Fall 2013**
  - Math 285 *Intro to Differential Equations* **Spring 2013**
  - Math 285 *Intro to Differential Equations* **Fall 2012**

Universitat Autonoma de Barcelona

- **Graduate Courses**
  - *Ergodic Theory and Fractal Geometry* **Fall 2011**

- **Undergraduate Courses**
  - *Statistics* **Spring 2012**

Lecture Notes

- Measure Theory, pdf
- Functional Analysis, pdf
- Ergodic Theory Techniques and Conformal Dynamics, pdf
- Harmonic Analysis, pdf
- Transition to Advanced Mathematics, pdf

Advising

PhD Students

- *Surath Fernando (University of Connecticut, 2021-present)*
- *Erik Wendt (University of Connecticut, 2020-present)*

Postdocs

- *Scott Zimmerman (University of Connecticut, 2017-2020), currently Assistant Professor at Ohio State University at Marion.*

Honors Senior Thesis supervised

- *Ben Arora (University of Connecticut, 2022)*
- *Sharon Spaulding (University of Connecticut, 2022)*
- *Eric Stassen (University of Connecticut, 2020)*

  Title: Fourier Analysis Applications to the Black-Scholes Equation Eric's thesis

Surath Fernando (University of Connecticut, 2017)

Title: The $T1$ Theorem on Metric Spaces Surath's thesis

Teaching Awards

University of Connecticut

- *Provost's Recognition for Teaching* *letter* **Fall 2020**
- *Provost's Recognition for Teaching* *letter* **Spring 2019**
- *Provost's Recognition for Teaching* *letter* **Fall 2018**
- *Provost's Recognition for Teaching* *letter* **Fall 2017**
- *Provost's Recognition for Teaching* *letter* **Spring 2017**
- *Provost's Recognition for Teaching* *letter* **Fall 2016**
- *Provost's Recognition for Teaching* *letter* **Spring 2016**

University of Illinois at Urbana-Champaign

- University's List of Excellent Teachers **Spring 2013**

Departmental Service

Committees

- Analysis Area Coordinator 2020-present.
- Graduate Program Committee (GPC) 2020-present.
- Undergraduate Program Committee (UPC) 2016-2018.
  - Coordinated the creation of the new course MATH 3710 W, aiming to attract applied math majors
  - Chair of the Math Majors subcommittee.

Outreach and Math Competitions

- Webmaster for the webpage Undergraduate Math Activities at UConn
- UConn's Putnam Supervisor and Course Organizer for the Putnam Problem Seminar
- Stuart Sidney Calculus Competition Organizer
- Directed Reading Program Coordinator
- Course Organizer for the GRE Math Subject Test seminar (pre Covid)

Seminar Organizing

- Organizer of UConn's Analysis and Probability seminar.
  - 21 talks in the academic year 2017-2018.
  - 21 talks in the academic year 2016-2017.