Quoc-Hung Nguyen

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Chinese Academy of Sciences,
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◇ Homepage, ◇ Google Scholar, ◇ YouTube Channel

Education

- October, 2011- September, 2014: Ph.D. of Laboratoire de Mathématiques et Physique Théorique, Université François-Rabelais, Tours, France.
  Thesis title: *Nonlinear potential theory and quasilinear equations with measure data.*
  Distinction awarded: Très Honorable avec Félicitations du Jury (Highly Honorable with Praises of the Jury).
  Advisors: Professors Marie-Françoise Bidaut-Véron and Laurent Véron.
  Referees: Professors Carlos Kenig, Guiseppe Mingione and Augusto Ponce.
  Examiners: Professors Fabrice Bethuel, Marie-Françoise Bidaut-Véron, Petru Mironescu, Augusto Ponce, Philippe Souplet, Étienne Sandier and Laurent Véron.

- 2010 - 2011: Master of Science in Applied Mathematics, University of Orléans.
  Advisors: Prof. Marie-Françoise Bidaut-Véron and Prof. Laurent Véron.

- 2006 - 2010: B.S in Faculty of Mathematics and Computer Science, University of Science, Hochiminh City National University.

Employment

- August, 2021 - present: Associate professor, Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Beijing, China.

- September, 2019 - July, 2021: Assistant Professor, ShanghaiTech University, Shanghai, China.

- August, 2018 - August, 2019: Postdoctoral Fellow, New York University Abu Dhabi.

- September, 2016 - July, 2018: Junior research position, the Centro di Ricerca Matematica Ennio De Giorgi, the Scuola Normale Superiore di Pisa, Italy.

- December, 2014 - August, 2016: Postdoctoral fellow, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland.

Research Interests

Partial Differential Equations.

PUBLISHED/ACCEPTED PAPERS

39. Thomas Alazar, Quoc-Hung Nguyen, *Quasilinearization of the 3D Muskat equation, and applications to the critical Cauchy problem* , Advances in Math (to appear), arXiv:2103.02474.

38. Ke Chen, Quoc-Hung Nguyen, and Yiran Xu, *The Muskat problem with C^1 data* , Trans. AMS (to appear), arXiv:2103.09732.

37. Thomas Alazard, Omar Lazar and Quoc-Hung Nguyen, *On the dynamics of the roots of polynomials under differentiation*, Journal de mathematiques pures et appliquées (to appear), arXiv:2104.06921

36. Quoc-Hung Nguyen; *Potential estimates and quasilinear parabolic equations with measure data,* Memoirs of the AMS, (2021), to appear, 120 pages. (3703478).

35. Quoc-Hung Nguyen *Quantitative estimates for regular Lagrangian flows with BV vector fields,* (2021) Comm. Pure Appl. Math., 74: 1129-1192. https://doi.org/10.1002/cpa.21992

34. Quoc-Hung Nguyen, Nguyen Cong Phuc; *Existence and regularity estimates for quasilinear equations with measure data: the case* $1 < p \leq \frac{3n-2}{2n-1}$, Analysis and PDEs (2021) (to appear), arXiv:2003.03725v1.

33. E. Brué, Quoc-Hung Nguyen: *Advection diffusion equations with Sobolev velocity field,* Commun. Math. Phys. 383, 465–487 (2021), https://doi.org/10.1007/s00220-021-03993-4

32. Hoai-Minh Nguyen, Quoc-Hung Nguyen, *The Weyl law of transmission eigenvalues and the completeness of generalized transmission eigenfunctions* Journal of Functional Analysis, Volume 281, Issue 8, 2021, 109146.

31. Thomas Alazar, Quoc-Hung Nguyen, *On the Cauchy problem for the Muskat equation with non-Lipschitz initial data*, Communications in Partial Differential Equations, 2021 DOI: 10.1080/03605302.2021.1928700.

30. Thomas Alazar, Quoc-Hung Nguyen, *On the Cauchy problem for the Muskat equation. II: Critical initial data*, Ann. PDE 7, 7 (2021). https://doi.org/10.1007/s40818-021-00099-x.

29. Quoc-Hung Nguyen, Yannick sire, Juan-Luis Vázquez; *A simple proof of the generalized Leibniz rule on bounded Euclidean domains*, Forum Mathematicum, 2021, pp. 000010151520200228. https://doi.org/10.1515/forum-2020-0228

28. Le Trong Thanh Bui, Quoc-Hung Nguyen; *Gradient weighted norm inequalities for very weak solutions of linear parabolic equations with BMO coefficients*, Asymptotic Analysis (2021) 1–15, DOI 10.3233/ASY-211693.

27. Quoc-Hung Nguyen, Nguyen Cong Phuc; *Quasilinear Riccati type equations with oscillatory and singular data*, Advanced Nonlinear Studies (2020) Volume 20, Issue 2, Pages 373–384 ,https://doi.org/10.1515/ans-2020-2079.

26. E. Brué, Quoc-Hung Nguyen: *Sobolev estimates for solutions of the transport equation and ODE flows associated to non-Lipschitz drifts,* Math. Ann. (2020). https://doi.org/10.1007/s00208-020-01988-5

25. M.F. Bidaut-Veron, Quoc-Hung Nguyen, L. Veron; *Quasilinear elliptic equations with a source reaction term involving the function and its gradient and measure data,* Calculus of Variations and Partial Differential Equations 59, 148 (2020).

24. Nguyen-Anh Dao, Jesus Ildefonso Diaz, Quoc-Hung Nguyen, *Fractional Sobolev inequalities revisited: the maximal function approach,* Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl. Volume 31, Issue 1, 2020, pp. 225–236DOI: 10.4171/RLM/887

23. E. Brué, Quoc-Hung : *Sharp regularity estimates for solutions to the continuity equation drifted by Sobolev vector fields*, Analysis and PDEs (2020), to appear, arXiv:1806.03466v2.

22. E. Brué, Quoc-Hung Nguyen: *On the Sobolev space of functions with derivative of logarithmic order,* Adv. Nonlinear Anal. 2020; 9: 836–849.

21. Quoc-Hung Nguyen, Nguyen Cong Phuc; *Pointwise estimate for gradient of solutions to quasilinear problem in singular case*, Journal functional analysis, (2020), **278** 108391.

20. Quoc-Hung Nguyen, Phuoc-Tai Nguyen, Bao Quoc Tang *Energy conservation for inhomogeneous incompressible and compressible Euler equations*, Journal of Differential Equations, Volume 269, Issue 9, 15 October 2020, Pages 7171-7210.

19. M.F. Bidaut-Veron, Quoc-Hung Nguyen, L. Veron; *Quasilinear and Hessian Lane-Emden Type Systems with Measure Data,* Potential Analysis, volume 52, pages 615–643(2020).

18. Quoc-Hung Nguyen, Phuoc-Tai Nguyen, Bao Quoc Tang *Energy equalities for compressible Navier-Stokes equations*, Nonlinearity, (2019), **23**.

17. E. Brué, Quoc-Hung Nguyen, Giorgio Stefani: *A maximal functiona characterization of absolutely continouos measures and sobolev functions*, Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl., (2019), **30** 599–614.

16. Quoc-Hung Nguyen, Phuoc-Tai Nguyen; *Onsager's conjecture on the energy convervation for solutions of Euler's equation in bounded domains*, Journal of nonlinear science, (2018), **29** 207–213.

15. Quoc-Hung Nguyen, Nguyen Cong Phuc; *Good-λ and Muckenhoupt-Wheeden type bounds in quasilinear measure datum problems, with applications*, Mathematische Annalen, (2018), 1–32.

14. Nguyen-Anh Dao, Jesus Ildefonso Diaz, Quoc-Hung Nguyen, *Generalized Gagliardo-Nirenberg inequalities using Lorentz spaces and BMO* Nonlinear Analysis: Theory, Methods, Applications., (2018), **173** 146-153.

13. Nguyen-Anh Dao, Quoc-Hung Nguyen *Brezis-Gallouet-Wainger type inequality with critical fractional Sobolev space and BMO,* Comptes Rendus Mathematique, (2018), **356** 747-756.

12. Quoc-Hung Nguyen, Juan Luis Vázquez; *Porous medium equation with nonlocal pressure in a bounded domain,* Communications in Partial Differential Equations , (2017), **43** 1502-1539.

11. Hoai-Minh Nguyen, Quoc-Hung Nguyen; *Discreteness of interior transmission eigenvalues revisited,* Calculus of Variations and Partial Differential Equations, (2017) 56: 51. doi:10.1007/s00526-017-1143-7.

10. Nguyen-Anh Dao, Quoc-Hung Nguyen; *Nonstationary Navier-Stokes equations with singular time dependent external forces,* Comptes Rendus Mathematique, (2017), **355**, 966-972.

9. M. F. Bidaut-Véron, Quoc-Hung Nguyen; *Pointwise estimates and existence of solutions of porous medium and p-Laplace evolution equations with absorption and measure data,* di Scienze Ann. Sc. Norm. Super. Pisa Cl. Sci. (5) **16** (2016), no. 2, 675-705. (arXiv:1407.2218).

8. Quoc-Hung Nguyen, L. Véron; *Wiener criteria for existence of large solutions of nonlinear parabolic equations with absorption in a non-cylindrical domain,* Journal of Differential Equations, **260**, 4805–4844 (2016).

7. M.F. Bidaut-Veron, Giang Hoang, Quoc-Hung Nguyen, L. Veron; *An elliptic semilinear equation with source term and boundary measure data*, Journal of Functional Analysis , **269**, 1995–2017 (2015).

6. Quoc-Hung Nguyen; *Global estimates for quasilinear parabolic equations on Reifenberg flat domains and its applications to Riccati type parabolic equations with distributional data*, Calculus of Variations and Partial Differential Equations, **54**, 3927-3948 (2015).

5. M. F. Bidaut-Véron, Quoc-Hung Nguyen; *Evolution equations of p-Laplace type with absorption or source terms and measure data,* Communications in Contemporary Mathematics, **17**, 1550006, (2015).

4. M. F. Bidaut-Véron, Quoc-Hung Nguyen; *Stability properties for quasilinear parabolic equations with measure data,* Journal of the European Mathematical Society , **17**, 2103–2135 (2015).

3. Quoc-Hung Nguyen, L. Véron; *Wiener criteria for existence of large solutions of quasilinear elliptic equations with absorption,* Potential Analysis **42**, 681-697 (2015).

2. Quoc-Hung Nguyen, L. Véron; *Quasilinear and Hessian type equations with exponential reaction and measure data,* Archive for Rational Mechanics and Analysis **214**, 235-267 (2014).

1. M. F. Bidaut-Véron, Quoc-Hung Nguyen, L. Véron; *Quasilinear Lane-Emden equations with absorption and measure data,* Journal de mathematiques pures et appliquées **102**, 315-337 (2014).

Submitted papers

45. Quoc-Hung Nguyen, Yannick Sire; *Potential theory for drift diffusion equations with critical diffusion and applications to the dissipative SQG equation*, submitted, arXiv:2003.10848v1

44. Thomas Alazar, Quoc-Hung Nguyen, *Endpoint Sobolev theory for the Muskat equation* , submitted, arXiv:2010.06915.

43. Quoc Anh Ngo, Quoc-Hung Nguyen, and Van Hoang Nguyen, *An optimal Hardy-Littlewood-Sobolev inequality on* $\mathbf{R}^{n-k} \times \mathbf{R}^n$ *and its consequences* , submitted, arXiv:2009.09868.

42. Quoc-Hung Nguyen, Matthew Rosenzweig and Sylvia Serfaty, *Mean-field limits of Riesz-type singular flows with possible transport noise*, submitted, arXiv:2107.02592.

41. Ke Chen and Quoc-Hung Nguyen, *The Peskin Problem with* BMO^1 *initial data*, submitted, arXiv:2107.13854.

40. Ke Chen, Quoc-Hung Nguyen and Na Zhao, *Global Calderón–Zygmund theory for parabolic p-Laplacian system: the case* $1 < p \leq \frac{2n}{n+2}$, submitted, arXiv:2109.02595.

In preparation

49. Quoc-Hung Nguyen, Nguyen Cong Phuc, *Comparison estimate for singular p-Laplace equation and its consequences*, in preparation.

48. Stephen Carome, Lingjia Huang, Quoc-Hung Nguyen and Yiran Xu; *A toy model for 2d Muskat equation in super-critical data,* in preparation.

47. Lingjia Huang, Quoc-Hung Nguyen and Yiran Xu, *Sharp estimates for screened Vlasov-Poisson system around Penrose-stable equilibria*, in preparation.

46. Thomas Alazard, Omar Lazar and Quoc-Hung Nguyen, *Well-posedness for the 2d Muskat problem with surface tension in critical initial data,* in preparation.

Invited Talks

- June 2012: poster, Quasinear equations and singular problems: a conference of Fronts and Interfaces in Science and Technology, LMPT, Tours, France.
- November 2013: Analysis Seminar, EPFL, Lausanne, Switzerland.
- July 2015: Analysis seminar, Faculty of Mathematics and Computer Science, University of Science, Hochiminh City National University, VietNam.
- December 2015: Workshop on Regularity Theory on Elliptic and Parabolic Equations at Department of Mathematical Sciences, Seoul National University, Seoul, Korea.

- June 2016: Inverse problems, Control and Shape Optimization, Autrans, France.
- July 2017: Summer Meeting 2017, HCM, Vietnam
- Sep 2017: Nonlinear Days in Turin, Turin, Italy.
- Feb 2018: Workshop on Harmonic analysis and Nonlinear Evolution Equations, Pisa University, Pisa, Italy.
- April 2018: Analysis Seminar, Basel, Switzerland.
- May 2018: Analysis Seminar, Scuola Normale Superiore di Pisa, PISA, Italy
- March 2019: Colloquium, Shanghaitech university, Shanghai, China.
- November 2019: Analysis Seminar, the School of Mathematical Science of Fudan University, Shanghai.
- December 2019: Analysis Seminar, Scuola Normale Superiore di Pisa, Pisa, Italy.
- January, 2020: Analysis Seminar, Department of Mathematics, Louisiana State University, Louisiana, USA.
- January, 2020: Analysis of Fluids and Related Topics Seminar, Princeton University.
- February, 2020: CSCAMM Seminar, Maryland University, USA.
- February, 2020: Analysis Seminar, Department of Mathematics, John Hopkins University, USA.
- April, 2020: Analysis Seminar via Zoom, Department of Mathematics, University of Pennsylvania, USA.
- June, 2020: Open PDE and Analysis Seminar, organized by Thomas Alazard (ENS Paris-Saclay), Nicolas Burq (Orsay) and Iván Moyano (Nice).
- August, 2020: PDE and Analysis Seminar via Zoom, School of Mathematics, Korea Institute for Advanced Study (KIAS).
- November 8 -November 13, 2020: BIRS-IAS workshop: Nonlocal Problems in Mathematical Physics, Analysis and Geometry, Hangzhou, China (Cancelled)
- December 16th , 2020: Geometry Seminar, Department of mathematics, University of California San Diego, USA.
- December 27th-29th, 2020: Invited speaker, The International Consortium of Chinese Mathematicians, hosted by Yau Mathematical Sciences Center (YMSC) at Tsinghua University and School of Mathematical Sciences at University of Science and Technology of China.
- January 2021: Mini-Workshop on PDE in 2021, Shanghai.
- March 2021: MSRI seminar of Mathematical problems in fluid dynamics.
- April 2021: Brown PDE Seminar.
- April 2021: PDE Seminar, University of Pennsylvania.
- April 2021: USC Analysis and PDE seminar, University of Southern California.
- April 2021: Math Colloquium, NYU Abu Dhabi.
- May 2021: PDE and Applied Math seminar , University of California, Davis.
- May 2021: PDE seminar, CAS Academy of Mathematics and Systems Science, Beijing.
- June 17- 21, 2021: The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Atlanta, USA (Cancelled).
- July, 2021: PDE seminar, University of Regensburg, Germany.
- September, 2021: PDE seminar, Beijing International Center for Mathemati-

cal Research (BICMR), Peking University.
- October, 2021: PDE seminar, Duke Kunshan University, China.
- December 7–10, 2021: The 65th Annual Meeting of the Australian Mathematical Society, session on Harmonic Analysis and hyperbolic PDEs.
- March 14-18, 2022: mini-symposium on "Regularity and Irregularity in Fluid Dynamics" in the SIAM Conference on Analysis of Partial Differential Equations 2022, at Germany (moved online).

Short Academic Visits:

- April 2017: one week, EPFL, Lausanne, Switzerland. Host: Hoai-Minh Nguyen.
- April 2018: one week, University of Basel, Basel, Switzerland. Host: Crippa Gianluca.
- Fall 2018: one week, EPFL,Lausanne, Switzerland. Host: Hoai-Minh Nguyen.
- January 6-10, 2019: , EPFL, Lausanne, Switzerland. Host: Hoai-Minh Nguyen.
- June-July 2019: Scuola Normale Superiore di Pisa, PISA, Italy. Host: Luigi Ambrosio.
- December 16-20, 2019: Scuola Normale Superiore di Pisa, PISA, Italy. Host: Luigi Ambrosio.
- January 13- January 18, 2020: Department of Mathematics, Louisiana State University, Louisiana, USA, Host: Nguyen Cong Phuc.
- January 18- February 2, 2020: Institute for Advanced Study and Princeton, New Jersey, USA. Host: Camillo De Lellis.
- February 3 -February 8, 2020: Maryland University, College Park, Maryland, USA. Host: Pierre-Emmanuel Jabin.

Service:

- September, 2019- June, 2021: Organized Analysis Seminar at the Institute of Mathematical Sciences, ShanghaiTech University.
- April, 2020- May, 2021: Organized PDE seminar via Zoom at ShanghaiTech Univeristy, every Thursday.
- May 1st-3rd, 2020: Organized IMS Lecture Series on Regularity Theory for Quasilinear Equations.
- June 1st-3rd, 2020: Organized Singular Problems Associated to Quasilinear Equations, a workshop in celebration of Marie-Francoise Bidaut-Véron and Laurent Véron's 70th Birthday.
- July 13th-14th, 2020: Organized SGPDE workshop.
- January 11th, 2021: Organized Mini-Workshop on PDE in 2021.
- September, 2021- present: Organized onsite PDE Seminar at Academy of Mathematics and Systems Science, Chinese Academy of Sciences.
- October, 2021- present: Organized PDE seminar via Zoom at Chinese Academy of Sciences, every Thursday.

Teaching:

- Fall 2010 : Teaching Assistant for Analysis 1 at the department of Mathematics and Computer Science, University of Sciences, Hochiminh City National University, Vietnam.
- Spring 2016: Teaching Assistant for Analysis 4 at EPFL, Lausanne, Switzer-

land.

- May-August, 2020 : *Regularity Theory for Elliptic equations* for undergraduate of the Department of Mathematics, Hochiminh City University of Education, Ho Chi Minh City, Vietnam.
- Fall 2020 : *Fourier transform and its application* for undergraduate of the department of Mathematics and Computer Science, University of Sciences, Hochiminh City National University, Vietnam.
- Spring 2020: *An Introduction to Fourier Analysis* for undergraduate of ShanghaiTech university (Cancelled).

PROFESSIONAL SERVICE:

Referee for the journals: Advances in Mathematics, Journal of Differential Equations, Potential Analysis, Journal of Elliptic and Parabolic Equations, Communications in Contemporary Mathematics, Nonlinear analysis series A: Theory, Methods & Applications , Annali di Matematica Pura ed Applicata (1923 -) , Differential and Integral Equations, Advances in Nonlinear Analysis, Discrete and Continuous Dynamical Systems, Mathematische Annalen, Nonlinear Differential Equations and Applications NoDEA, Proceedings of the London Mathematical Society, Discrete and Continuous Dynamical Systems, Proceeding of the Royal Society of Edinburgh, Advanced Nonlinear Studies, Nonlinearity, Journal of the European Mathematical Society, Archive for Rational Mechanics and Analysis, Communications in Mathematical Research, Calculus of Variations and Partial Differential Equations, Bulletin des sciences mathématiques, Applied Mathematics Letters, Zeitschrift fuur angewandte Mathematik und Physik.

GRANTS/AWARDS:

- Startup fund of AMSS, CAS: 200,000 RMB per year.
- Startup fund of ShanghaiTech Univerisity: 900,000 RMB from 2019 to 2021.
- the National Natural Science Foundation of China (12050410257): 400,000 RMB in 2 years from 2021 to 2023 and NSFC Fund's staff support: 200,000 RMB.
- Award: Excellent Faculty of 2020, ShanghaiTech.

MENTORING:

Phd:

Ke Chen (Female) and Xiran Xu (Female), Lingjia Huang (Female), co-advised with Professor Zhen Lei (Students are from Fudan University).

Ruilin Hu (AMSS, CAS) co-advised with Professor Ping Zhang.

Post Doc:

2019 - 2020: Nguyen Anh Dao.