NIKOLAOS CHALMOUKIS

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Research Interests

Complex analysis in one and several complex variables. Interpolating sequences for spaces of holomorphic functions. Operator theory on Hilbert spaces, functional calculi and von Neumann type inequalities. Potential theory on graphs and function spaces. Maximal functions and harmonic analysis, functional analysis, base theory for Hilbert spaces from the viewpoint of interpolation. Semigroups of analytic functions in the unit disc.

Positions

Researcher of type A (RTDA) — January 2023 - Present, Department of Mathematics and Applications, University of Milano–Bicocca, Italy

Postdoctoral position, Humboldt foundation fellow — April 2022 - December 2022, Department of Mathematics and Computer Science, University of Saarland, Germany

Assegno di ricerca — March 2021 - February 2022, Department of Mathematics, University of Bologna, Italy

Education

Ph.D.in Mathematics — Date of final exam: 11 December 2020 (Excellent with honours), University of Bologna, Italy

Master of Science in Mathematics — September 2017 (3/3), Lund University, Sweden

Degree in Mathematics — November 2015 (9.83/10), Aristotle University of Thessaloniki, Greece

Awards, fellowships and qualifications

"Profeseur des universités", Qualification for professorship in France. No. 24125389433   06.02.2024

Premio giovani talenti Prize for young talents (3rd Prize) from the University of Milano Bicocca   2023

Alexander von Humboldt Research Fellowship for Postdocs - Alexander von Humboldt Foundation   2022

Kovalevskaya grant for participation in the International Congress of Mathematics ICM2022 (Event cancelled) 2022

INdAM-DP-COFUND-2015 fellowship (INdAM Doctoral Programme in Mathematics and/or Applications Cofunded by Marie Sklodowska-Curie Actions)   2017-2020

Fellowship Alexander S. Onassis Public Benefit Foundation for my MSc studies at Lund University   2016-2017

Commendation for excellent performance during my studies in the department of mathematics of the Aristotle University of Thessaloniki.   2011-2015

Scholarship from IKY (Greek State Scholarships Foundation) for distinction in my studies in mathematics. 2011-2012

Grants and projects

Scientific coordinator of the INdAM-GNAMPA project "Function theory in several complex and quaternionic variables", with number CUPE53C22001930001 (2.500 euro)   2023 —2024

Member of the INdAM–GNAMPA Project "Generalized Laplacians on continuous and discrete structures" Principal Investigator: Tommaso Bruno   2022—2023

Research grant from Ministry of Science and Higher Education of the Russian Federation, agreement No. 075-15-2019-1619.   2021

Member Member of the research group funded by the grant "2nd call for H.F.R.I.'s research projects to support faculty members & researchers" (165.000 euro) . Principal investigator: A. Siskakis. 2021-2024

Invited Talks

The Drury Arveson space from a harmonic analyst's perspective, Analysis on Complex and Discrete Structures, Università degli studi di Milano, Italy 02.2025
Invited talk

Interpolating sequences in Dirichlet type spaces, Bench Math Session 2025, Jagiellonian University, Poland 02.2025
Invited Talk

TBA, Advances Courses in Operator Theory and Complex Analysis (ACOTCA), Clermont-Ferrand, France 06.2025
Plenary Talk

TBA, International Workshop on Operator Theory and its Applications, Special session of harmonic analysis, Twente, Netherlands 07.2025 *Invited Talk*

TBA, Hilbert Function Spaces, Villa Mondragone, Italy 06–07.2025 *Plenary Talk*

Potential theory and exceptional sets for the Drury Arveson space, Joint Meeting AMS-UMI, Special Session "Several Complex Variables: Theory and Applications", Palermo, Italy 07.2024 *Invited talk*

Potential theory and exceptional sets for the Drury Arveson space, Spaces of analytic functions and their operators, Saarland University, Germany 05.2024 *Plenary talk*

Shift operators and toral endomorphisms, Complex Analysis Seminar - Bench Math Session, Jagiellonian University, Poland 12.2023 *Invited talk*

The exceptional sets of the Drury Arveson space, XXII Congresso dell'Unione Matematica Italiana (UMI), Special session of harmonic analysis, Italy 09.2023 *Invited talk*

Composition semigroups and Sarason's characterization of VMOA, International Workshop on Operator Theory and its Applications (IWOTA), Special session: Hilbert function spaces in one and several complex variables, Helsinki, Finland 08.2023 *Invited talk*

Interpolating sequences for Complete Nevanlinna Pick spaces, Recent Advances in Function Spaces and Their Operators, Marrakesh, Morocco 05.2023
Plenary Talk

The exceptional sets of the Drury-Arveson space, Journée d'Analyse Harmonique, Institut de Mathématiques de Marseille, France 12.2022
Invited talk

The exceptional sets of the Drury-Arveson space, Seminari d'Anàlisi de Barcelona, UAB, Spain 11.2022 *Seminar*

Exceptional sets for Hardy Sobolev spaces in several complex variables, International Workshop on Operator Theory and its Applications (IWOTA), Special session of functional calculus and spectral constants, Krakow, Poland 09.2022
Invited Talk

Interpolation by analytic functions in Dirichlet type spaces, New Trends in Complex and Fourier Analysis and Operator Theory, Torino, Italy 09.2022 *Invited talk*

Exceptional sets for Hardy Sobolev spaces in several complex variables, Politecnico di Milano analysis seminar, Italy 07.2022 *Seminar*

Semigroups of composition operators and Sarason's characterization of VMOA, Conference in honor of Nikolai Nikolski, Operators, Functions, Systems: Classical and Modern, Banach Center, Będlewo, Poland   06.2022 *Invited Talk*

Exceptional sets for Hardy Sobolev spaces in several complex variables, CR Geometry and PDEs IX, Levico Terme, Italy   05.2022 *Invited Talk*

Semigroups of composition operators on spaces of analytic functions, Research Seminar Noncommutative and Functional Analysis, Saarland University, Germany   05.2022 *Seminar*

Weighted dyadic Hardy inequalities, Geometric Aspects of Complex and Harmonic Analysis, University of Bologna, Italy   01.2022 *Invited talk*

Interpolation by analytic functions in Sobolev spaces, Bruno Pini Mathematical Analysis Seminar, University of Bologna, Italy   12.2021 *Seminar*

Holomorphic semigroups and Sarason's characterization of vanishing mean oscillation, Complex and Harmonic Analysis and its Applications, Saint Petersburg State University (Online)   11.2021 *Invited talk*

Hardy Sobolev spaces in several complex variables, BIRS-CMO Workshop, Multivariable Operator Theory and Function Spaces in Several Variables (Online)   08.2021 *Invited talk*

Onto interpolation for the Dirichlet space and for $H_1(D)$, Seminar in Complex and Harmonic Analysis, Euler International Mathematical Institute, St. Petersburg (Online)   02.2021 *Seminar*

Totally null sets and capacity in Dirichlet type spaces, Euler International Mathematical Institute, Seminar in Complex and Harmonic Analysis, St. Petersburg (Online)   11.2020 *Seminar*

Random interpolating sequences in Dirichlet type spaces, St. Petersburg Youth Conference on Probability and Mathematical Physics (Online)   12.2020 *Invited talk*

Contributed talks and miscellaneous seminars

On an interpolation problem in spaces with the complete Pick property, XLII Convegno Armonica, Milano Bicocca 05.2023

The exceptional sets of the Drury Arveson space, University of Bologna, Regular seminar of the complex analysis lab 02.2023

Invariant capacities in the unit ball of $\mathbb{C}^n$ and exceptional sets for Hardy Sobolev spaces, Second Congress of Greek Mathematicians SCGM-2022   07.2022

Exceptional sets for Hardy Sobolev spaces in several complex variables, First UMI meeting of PhD students 05.2022

Holomorphic semigroups and Sarason's characterization of vanishing mean oscillation, Focus Program on Analytic Function Spaces and their Applications, Fields Institute   09.2021

Holomorphic semigroups and Sarason's characterization of vanishing mean oscillation, Communication in "Real and Complex Manifolds. The Mathematical Heritage of Edoardo Vesentini"   06.2021

Weighted dyadic Hardy inequalities, Convegno Nazionale di Analisi Armonica   05.2021

Random Interpolating Sequences in Dirichlet Spaces, CIRM, Marseille, "Interpolation in Spaces of Analytic Functions"   11.2019

Onto Interpolation for the Dirichlet Space and for $W^{1,2}$, IRP SAFAIS-2019, Workshop "Spaces of Analytic Functions: Approximation, Interpolation, Sampling"   10.2019

Onto Interpolation for the Dirichlet Space, Advanced Course of Operator Theory and Complex Analysis, University Paris-Est Marne-la-Vallée, France   06.2019

Unions of onto interpolating sequences for the Dirichlet space, Advances Course of Operator Theory and Complex Analysis, University of Bologna   06.2018

Unions of onto interpolating sequences for the Dirichlet space, Workshop on Complex Analysis and Operator Theory, Blanes   05.2018

The prime number theorem and Riemann's zeta function, BaD Seminars, University of Bologna   02.2018

Publications

(1) On the boundedness of generalized integration operators on Hardy spaces. Chalmoukis N., Nikolaidis G. 2024 In: Collectanea Math., DOI: 10.1007/s13348-024-00464-6

(2) Random Carleson sequences for the Hardy space on the polydisc and the unit ball. Chalmoukis N., Dayan* A., Lamberti G. 2024 In: J. Funct. Anal., Volume 287, Issue 12, 15 December 2024, 110659, DOI: 10.1016/j.jfa.2024.110659

(3) Carleson measures for Hardy-Sobolev spaces in the Siegel upper half-space. Chalmoukis N., Lamberti G. 2024 In: J. Math. Anal. Appl., Volume 540, Issue 2, 15 December 2024, 128635, DOI: 10.1016/j.jmaa.2024.128635

(4) Generalized Hilbert operators arising from Hausdorff matrices. Chalmoukis N., Bellavita C., Daskalogiannis V., Stylogiannis G. 2024 In: Proc. Amer. Math. Soc., DOI: 10.1090/proc/16917, September 2024

(5) On the speed of convergence in the ergodic theorem for shift operators. Chalmoukis N., Colzani L., Gariboldi B., Monguzzi A. 2024 In: Canad. Math. J., Published online 2024:1–19, DOI: 10.4153/S0008414X24000658

(6) Simply interpolating sequences in complete Pick spaces. Chalmoukis N., Dayan A., Hartz* M. 2024 In: Trans. Amer. Math. Soc., Volume 377, Number 5, 3261–3286, May 2024

(7) Two-weight Hardy's inequalities. Arcozzi N., Chalmoukis N.*, Levi M., Mozolyako P. 2023 In: Rendiconti Lincei. Matematica e Applicazioni, Volume 34, No. 3, pp. 657–714

(8) A note on simply interpolating sequences for the Dirichlet space. Chalmoukis N.* 2023 In: New York Journal of Mathematics, Volume 29, pp. 193–202

(9) Totally null sets and capacity in Dirichlet type spaces. Chalmoukis N., Hartz M.* 2022 In: J. London Math. Soc., Volume 106, Number 3, pp. 2030–2049, DOI: 10.1112/jlms.12617

(10) Random interpolating sequences in Dirichlet spaces. Chalmoukis N., Hartmann A., Kellay K.*, Wick B. D. 2022 In: Int. Math. Res. Not. IMRN, Volume 2022, Issue 17, August 2022, Pages 13629–13658, DOI: 10.1093/imrn/rnab110

(11) Riesz capacities of a set due to Dobiński. Arcozzi N., Chalmoukis N.* 2022 In: C. R. Math. Acad. Sci. Paris, Volume 360, pp. 679–685, DOI: 10.5802/crmath.332

(12) Holomorphic semigroups and Sarason's characterization of vanishing mean oscillation. Chalmoukis N.*, Daskalogiannis V. 2022 In: Rev. Mat. Iberoam., DOI: 10.4171/RMI/1346

(13) Quasi-nilpotency of generalized Volterra operators on sequence spaces. Chalmoukis N., Stylogiannis G. 2021 In: Results Math., Volume 76, Article 173, DOI: 10.1007/s00025-021-01482-7

(14) The Drury-Arveson space on the Siegel upper-half plane and a von Neumann type inequality. Arcozzi N., Chalmoukis N.*, Monguzzi A., Peloso M.M., Salvatori M. 2021 In: Integral Equations and Operator Theory, Volume 93, Number 59, DOI: 10.1007/s00020-021-02674-0

(15) Onto interpolating sequences for the Dirichlet space and for $H_1(\mathbb{D})$. Chalmoukis N. 2021 In: Adv. Math., Volume 381, Article 107634, DOI: 10.1016/j.aim.2021.107634

(16) Some remarks on the Dirichlet problem on infinite trees. Chalmoukis N., Levi M. 2019 In: Concrete Operators, Volume 6, Issue 1, Pages 20–32, DOI: 10.1515/conop-2019-0002

(17) Generalized integration operators on Hardy spaces. Chalmoukis N. 2020 In: Proc. Amer. Math. Soc., Volume 148, Number 8, pp. 3325–3337, DOI: 10.1090/proc/15016

* Corresponding author

Preprints

(1) Potential theory and boundary behavior in the Drury–Arveson space. Chalmoukis N., Hartz M. 2024 arXiv:2410.07773

(2) Simply interpolating and Carleson sequences for Hardy spaces in the polydisc. Chalmoukis N., Dayan A. 2024 arXiv:2412.09099

Teaching

PhD Course, Interpolation and sampling in holomorphic function spaces, U. of Bologna (30 hours; together with N. Arcozzi)   Spring 2023

Minicourse, Interpolation by analytic functions, St. Petersburg State University and Euler International Mathematical Institute (4 hours)   Fall 2021

Teaching Assistant (In English), Mathematics for Social Sciences, U. of Bologna, Course: Laurea in Economics, politics and social sciences (40 hours)   Fall 2021

Teaching Assistant (In Italian), Analysis I, U. of Bologna, Course: Chemical and biochemical engineering (30 hours). Fall 2011

Teaching Assistant (In Italian), Calculus and elements of probability, U. of Bologna, Civil engineer department (30 hours).   Spring 2021

Minicourse An introduction to interpolating sequences in Reproducing Kernel Hilbert Spaces, U. of Bologna. (6 hours)   Fall 2019

Teaching Assistant (In Italian), Mathematical Analysis I, U. of Bologna, Civil engineer department (30 hours).   Fall 2018

Co-advisor of the Master Thesis of Miriam Abbate, UNIBO (2023)

Organization experience

Special session of the conference "International Workshop on Operator Theory and its Applications" 2025, U. of Twente.

4th Young Researchers Workshop in Harmonic Analysis 2025, U. of Milano.

Advanced Courses in Operator Theory and Complex Analysis 2023, Aristotle University of Thessaloniki, Greece

Advanced Courses in Operator Theory and Complex Analysis 2018, University of Bologna, Italy

Organization of the circle of seminars for PhD students and Post Doctoral Researchers "BaD Seminars"

Co-organiser and occasional speaker of the series of seminars "Complex Analysis Lab at UniBo"

Research stays

Sabanci University, Istanbul, Turkey. Invited by professor D. Papathanasiou   14.4.2025-27.4.2025

Mathematisches Forschungsinstitut Oberwolfach (MFO), Research in Pairs (with A. Dayan)   23.02.2025-7.3.2025

Saarland University, Saarbrücken, Germany. Invited by professor M. Hartz   29.1.2025-7.2.2025

Universitat Autònoma de Barcelona (UAB), Barcelona, Spain. Invited by Professor A. Nicolau   November 2022

Institut de Mathématiques de Bordeaux (IMB), Bordeaux, France. Invited by professor A. Hartman   February 2020

Aristotle University of Thessaloniki (AUTH), Department of Mathematics, Greece. Invited by professor A. Siskakis
September 2018

Student mentorship

Co-advisor, Master Thesis of Miriam Abbate, University of Bologna (UNIBO)   2022-2023
Best Master Thesis in Mathematics Award, "con.Scienze 2023"

PhD Supervisor, Giovanni Marano, University of Milano Bicocca   2024–Present

PhD Committee Member, Gianluca Giacchi, PhD Thesis: "Several aspects of modern signal analysis"   2025
Joint PhD program, University of Bologna and University of Lausanne

Other relevant information

Reviewer for international mathematical journals. Among them: Anal. PDE, J. Funct. Anal., Studia Math., Constr. Approx., J. Math. Anal. Appl., Complex Anal. Oper. Theory, Complex Var. Elliptic Equ., Rend. Circ. Mat. Palermo (2), Proc. Amer. Math. Soc., Ann. Polon. Math., Demonstratio Math., J. Geom. Anal., Armenian J. Math.

Languages: Greek (mother-tongue), English (fluent), Italian (fluent), French (beginner)

Member of the Italian Mathematical Union (UMI)

Member of the INdAM group GNAMPA (Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni)

Reviewer for Mathematical Reviews (MathSciNet)