

# Subhadip CHOWDHURY

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[subhadipchowdhury.github.io](https://github.com/subhadipchowdhury)

## PERSONAL INFORMATION

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Date of Birth	27 May, 1992
Citizenship	India

## ACADEMIC APPOINTMENTS

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2018–Present	<b>Visiting Assistant Professor</b> <i>Bowdoin College, USA</i>
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## EDUCATION

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2012–2018	<b>Ph.D. in Mathematics</b> <i>The University of Chicago, USA</i> <ul style="list-style-type: none"><li>• Advisor - Danny CALEGARI</li><li>• Dissertation Title - Self-similarity of Ziggurat Fringes and Rigidity of Extremal Free Group Actions on the Circle</li></ul>
2014	<b>M.S. in Mathematics</b> <i>The University of Chicago, USA</i> <ul style="list-style-type: none"><li>• Topic Proposal - Stable Commutator Length and Quasimorphisms</li></ul>
2009–2012	<b>Bachelor of Mathematics</b> <i>Indian Statistical Institute, Bangalore Centre, India</i> <ul style="list-style-type: none"><li>• First Division with Distinction</li></ul>

## RESEARCH INTERESTS

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Low dimensional dynamics and topology, specifically nonabelian group actions on the circle. Application of algebraic topology to formal language theory. Related topics in geometry and geometric group theory.

## PUBLICATIONS AND PREPRINTS

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- **Ziggurat fringes are self-similar.** *Ergodic Theory and Dynamical Systems*, doi:10.1017/etds.2015.75.

In this paper, we give explicit formulae for fringe lengths of the Calegari-Walker Ziggurats – i.e. graphs of extremal rotation numbers associated to positive words in free groups. These formulae reveal (partial) integral projective self-similarity in ziggurat fringes, which are low-dimensional projections of characteristic polyhedra on the bounded cohomology of free groups. This explains phenomena observed experimentally by Gordenko and Calegari-Walker.

- **A Topological proof that  $O_2$  is 2-MCFL.** [arxiv.org/abs/1710.04597](https://arxiv.org/abs/1710.04597)

In this paper, we give a new proof of Salvati's theorem that the group language  $O_2$  is 2 multiple context free using

homology theory. Unlike Salvati's proof, our arguments do not use any idea specific to two-dimensions. This raises the possibility that the argument might generalize to  $O_n$ .

## TEACHING EXPERIENCE

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2018-2019	<b>Instructor of Record, Bowdoin College</b> <ul style="list-style-type: none"> <li>Differential Calculus, Math 1600 (Fall 2018),</li> <li>Multivariable Calculus, Math 1800 (Fall 2018, Spring 2019)</li> <li>Linear Algebra, Math 2000 (Spring 2019)</li> </ul>
Summer 2018	<b>Mathematics Instructor, Chicago Academic Achievement Program, University of Chicago College</b> <ul style="list-style-type: none"> <li>Proof-Based Methods in Mathematics</li> </ul>
2014-2018	<b>Instructor of Record, University of Chicago</b> <ul style="list-style-type: none"> <li>Mathematical Methods for Social Sciences, Math 195 (Fall 2017), __, Math 195 (Winter 2018)</li> <li>Linear Algebra, Math 196 (Summer 2017)</li> <li>Calculus II, Math 152 (Fall 2016), __ III, Math 153 (Winter 2017)</li> <li>Calculus II, Math 152 (Fall 2015), __ III, Math 153 (Winter 2016), Elementary Functions and Calculus III, Math 133 (Spring 2016)</li> <li>Calculus I, Math 151 (Fall 2014), __ II, Math 152 (Winter 2015), __ III, Math 153 (Spring 2015)</li> </ul>
2013-2014	<b>College Fellow, University of Chicago</b> <ul style="list-style-type: none"> <li>Teaching Assistant for Honors Calculus I-III, Math 161-163 taught by Eugenia CHENG</li> </ul>
2014,2016	<b>Mentor for Research Experience for Undergraduates, University of Chicago</b> Advised expository and research papers written by undergraduate students <ul style="list-style-type: none"> <li><i>Scissors congruence, Rationality of zeta functions over finite fields, Canonical energy and black hole stability</i> (Summer 2016); <i>An introduction to knot theory and the knot group, The Jordan-Chevalley decomposition</i> (Summer 2014).</li> </ul>
2014–2016	<b>Directed Reading Program Mentor, University of Chicago</b> Met weekly with undergraduate students to guide mathematics reading projects <ul style="list-style-type: none"> <li><i>Topology</i> with Dan Su (Winter 2016), <i>The dynamics of Circle Homeomorphisms</i> with Wenyu Chen (Fall 2015), <i>Discrete Group actions on Topological Spaces</i> with Weston Ungemach (Spring 2014).</li> </ul>
2013-2017	<b>Grader for First year graduate courses, University of Chicago</b> <ul style="list-style-type: none"> <li>Riemannian Geometry taught by André NEVES (Spring 2017)</li> <li>Differential Topology taught by Danny CALEGARI (Winter 2016)</li> <li>Differential Geometry taught by Sidney WEBSTER (Winter 2015)</li> <li>Algebraic Topology taught by Danny CALEGARI (Fall 2013)</li> </ul>
2010–2011	<b>Instructor in Regional Mathematical Olympiad and National Mathematical Olympiad Training Camp</b> in Kolkata, West Bengal and Bangalore, Karnataka, India

## OTHER SERVICE

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2015-2018	Led a team of graduate students to place incoming Freshmen students via the <i>University of Chicago College Calculus Accreditation Exam</i> under supervision of Jitka STEHNOVA and John BOLLER
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2015	<b>Judge, QED Young Math Symposium</b> , <i>Math Circles of Chicago</i> <ul style="list-style-type: none"> <li>• Chicagos only youth math symposium</li> </ul>
2014–2018	Webmaster and active member of the UChicago chapter of <i>Association for Women in Mathematics</i>
2014–Present	Member of the American Mathematical Society

## INVITED TALKS

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April 2018	<i>American Mathematical Society Spring Southeastern Sectional Meeting</i> , Vanderbilt University, Nashville, TN, USA
January 2018	<i>Joint Mathematical Meetings - AMS Special Session on Dynamical Systems: Smooth, Symbolic, and Measurable</i> , San Diego, California, USA
September 2017	<i>American Mathematical Society Fall Eastern Sectional Meeting</i> , SUNY, Buffalo, USA
December 2016	<i>Canadian Mathematical Society Winter Meeting</i> , ON, Canada

## AWARDS AND SCHOLARSHIPS

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2012–2013	<b>McCormick Fellowship</b> , University of Chicago Awarded by the Admissions Committee to a small number of highly rated applicants to the Ph.D. program of the Department of Mathematics, for an amount of \$9000 over two years.
2012	<b>S.H. Aravind Gold Medal</b> , Indian Statistical Institute Awarded for outstanding performance in B. Math, to the student with highest CGPA in the program.
2011	<b>Summer Reaserch Fellowship</b> , Indian Academy of Science
2009	<b>Bronze medal, 50th International Mathematical Olympiad</b> , Germany
2009	<b>National Board of Higher Mathematics scholarship</b> , Department of Atomic Energy, Government of India
2008	<b>Kishore Vaigyanik Protsahan Yojana fellowship</b> , Department of Science and Technology, Government of India
2007	<b>National Talent Search Examination scholarship</b> , National Council of Education Research and Training, India

## SKILLS AND LANGUAGES

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Technical Language	C, Python, Haskell, Mathematica, Octave, PHP, HTML, CSS, $\text{\LaTeX}$ , MS Office English, Bengali, and Hindi - fully proficient in speaking, reading, and writing
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