ACADEMIA SINICA
EARLY-CAREER INVESTIGATOR
RESEARCH ACHIEVEMENT AWARD

蔡 政 江
中央研究院數學研究所副研究員

代表著作：

📖 **Cheng-Chiang Tsai**, 2023, Aug. 15th, "Geometric Wave-Front Set May Not Be a Singleton," *J. Amer. Math. Soc.* 37, 281-304.

簡評：

　　蔡博士在波形集的工作不僅反證一個關於 p 進位群冪零軌道的長期猜想，也為 p 進位群上的調和分析創造新的思考方向。

　　The work of Dr. Tsai on the wavefront sets of p-adic groups not only disproves a long-standing conjecture on unipotent orbits of p-adic groups, but also opens the door to new ways of thinking about the p-adic harmonic analysis.

簡歷：

　　蔡政江博士 2010 年畢業於臺大數學系，2015 年於哈佛大學取得數學博士學位，先後於麻省理工學院和史丹佛大學任職博士後職位，並於 2020 年返國任職於中央研究院數學研究所至今。他的研究興趣和專長是表現理論和數論，特別專精於朗蘭茲綱領和 p 進位群的表現理論相關的問題。

　　Dr. Cheng-Chiang Tsai got his bachelor degree from NTU math in 2010 and PhD from Harvard math in 2015. After working as a postdoc at MIT and Stanford, he returned to Taiwan to be a member of the Institute of Mathematics at Academia Sinica. He is interested in representation theory and number theory, particularly on the Langlands program and representations of p-adic groups.

代表作簡介：

　　波前集（wavefront set）脫胎於微分方程和數學物理的研究，近五十年前被推廣和應用於表現理論，做為控制李群的表現和自守表現的廣義傅立葉級數的一個不變量。這個不變量有來自傳統（實）李群的部分，也有來自 p 進位群的部分。自 1987 年以來，有個關於波前集的基本結構被普遍相信的猜想，該猜想說每個單一表現的波前集都有一個唯一的幾何軌道。蔡博士的研究推翻了前述猜想。

Wave-front set originates from the study of differential equations and mathematical physics, and has been generalized to representation theory as an invariant that control generalization of Fourier series for representations of Lie groups and automorphic representations. This invariant has its counterpart for (real) Lie groups and p-adic Lie groups. Since 1987, there has been the well-expected conjecture about wave-front sets that asserts that the wave-front set for an irreducible representation corresponds to a single geometric orbit. Tsai's work disproves this conjecture.

得獎感言：

　　我很感謝研究路上鼓勵、幫助我以及慷慨分享學問的許多老師和朋友，沒有他們我不可能有今天的一點成果。我非常感激成果獎小組的肯定以及辛勞。最後我希望感謝我的家人，在我人生的每個階段給予對我來說非常重要的支持。

　　I am very thankful to my teachers and my friends that have encouraged and helped me and generously shared with me their thought and insights. Without them, there is no way I could have got to the point I am. I am very grateful to the committee of this award for their approval and efforts. Lastly, I am deeply indebted to my family for all the utmost important support they have given me in all stages in my life.