

# Jackson Petty

206 Elm Street Box #205585, New Haven, CT 06520

jackson.petty@yale.edu • github.com/jopetty

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## EDUCATION

Yale College, New Haven, CT

2017 – Present

- Pursuing Bachelors of Art in Mathematics and Linguistics;
- Board member, Yale Undergraduate Mathematics Society. Founding member, Student Advisory Committee to Mathematics Department.

Le Centre de Langue et de Culture, Marrakech, Morocco

Summer 2016

- Received National Strategic Language Initiative for Youth (NSLI-Y) scholarship from the U.S. Department of State;
- Studied Modern Standard Arabic and Maghrebi Dialect in the advanced course.

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## PUBLICATIONS

- [1] Hirsch, J., Li, K., **Petty, J.**, and Xue, C. Aug. 2019. *Certain Hyperbolic Regular Polygonal Tiles are Isoperimetric*. Extends Hales' famous result of isoperimetric Euclidean tilings to compact hyperbolic manifolds. Identifies regular polygons with internal angle  $2\pi/3$  as isoperimetric minima among possible monohedral tilings of that area. Provides new proof of Hales' original result for monohedral tilings which does not use computers. Submitted to *Disc. Comp. Geom.* arXiv: [1910.12966](#).
- [2] Di Giosia, L., Habib, J., Hirsch, J., Kenigsberg, L., Li, K., Pittman, D., **Petty, J.**, Xue, C., and Zhu, W. Aug. 2019. *Optimal Monohedral Tilings of Hyperbolic Surfaces*. Proves existence of tilings of closed hyperbolic manifolds. Presents reduction argument and vertex transformation to show that the regular heptagon of area  $\pi/3$  is optimal  $n$ -gonal tile for  $3 \leq n \leq 10$ . Submitted to *Rose-Hulman Und. Res. J.* arXiv: [1911.04476](#).
- [3] Hirsch, J., Li, K., **Petty, J.**, and Xue, C. Aug. 2019. *The Optimal Double Bubble for Density  $r^p$* . Conjectures optimal two-volume isoperimetric region in Euclidean space weighted like  $r^p$  has vertex at origin. Verifies equilibrium of configuration. Presents novel proof of monotonicity in Euclidean case. Submitted to *Rose-Hulman Und. Res. J.* arXiv: [1908.10766](#).

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## RESEARCH EXPERIENCE

CLAY Lab

Summer 2020

- Computational Linguistics at Yale (CLAY). Working on semantic parsing of anaphoric sentences by Seq2Seq models;
- Expanding codebase for recurrent neural networks trained to explore hierarchical biases in language; Supervised by Robert Frank.

SUMRY REU

Summer 2019

- Summer Undergraduate Research Experience at Yale (SUMRY). Worked on isoperimetric tilings of compact hyperbolic manifolds and 2-dimensional bubbles in weighted Euclidean space;
- Extended Hales' result to regular polygonal tiles of certain area of closed hyperbolic manifolds; Supervised by Frank Morgan.

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## PROJECTS & MANUSCRIPTS

- [4] **Petty, J.** and McCowin, D. May 2020. *BERT Goes to Wall Street: Predicting adjusted, short-term stock movement through sentiment analysis of earnings calls*. Trains BERT neural network classifier to perform  $k$ -ary classification of question and answer excerpts of corporate earnings calls. Investigates claim that questions provide more market-moving information than answers. Coding in Python.
- [5] **Petty, J.** Dec. 2018. *Language Revitalization in Montana Salish & Hawai'ian*. Examines efforts of the Montana Salish tribe to revitalize their native language, in comparison to the revitalization of Hawai'ian several decades earlier.
- [6] **Petty, J.** Dec. 2018. *Notes on Abstract Algebra*. Expository course notes for Introduction to Abstract Algebra, MATH 350 at Yale University. Used by course instructor in subsequent years as instructional aid. Available on GitHub under Creative Commons License. GitHub: [jopetty/lecture-notes](https://github.com/jopetty/lecture-notes).
- [7] **Petty, J.**, Zhang, Y., and Kuldinow, D. May 2018. *Infant Mortality and Life Expectancy among World Bank Member States*. Explores correlation between life expectancy and infant mortality in relation to GNI, Continent, and CO<sub>2</sub> Emissions per capita. Uses Tukey HSD to show significance of GNI groups. Identifies positive correlation between life expectancy and log of CO<sub>2</sub> production per capita. Statistical analysis done in R. GitHub: [jopetty/S-DS-230](https://github.com/jopetty/S-DS-230).
- [8] **Petty, J.** May 2018. *SDSS Quasar Analysis*. Investigates quasar data from the Sloan Digital Sky Survey. Performs principle component analysis on quasar featural data. Trains polynomial regression on  $r-i$  color v.  $z$  redshift. Normality testing on  $r$  color data via Shapiro-Wilkes, Anderson-Darling, and subpopulation investigation. Statistical analysis done in Python. GitHub: [jopetty/ASTR-356](https://github.com/jopetty/ASTR-356).
- [9] **Petty, J.** Dec. 2017. "Across the Islands: Lexical and Phonetic Variation in Hawai'ian Dialects." In: *Model Papers from the Disciplines*. Investigates evidence of and historical motivation for divergence in dialects of Hawai'ian. Winner of Yale College Writing Contest. Published as Model Paper in Social Science. Yale University. URL: <https://orgsync.com/173289/files/1481868/show>.

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## TEACHING EXPERIENCE

Writing Partner August 2018 – Present

*Yale College Writing Center*

- Teach Yale college students techniques for writing, editing, and revising a wide variety of writing styles, including essays, creative writing, technical writing, and applications;
- Meet weekly with international students to conduct English as a Second Language tutoring session;
- Selected for exceptional writing and teaching ability;
- Teaching Fellow for ENGL 114.

Writing Tutor May 2020

*Warrior-Scholar Project*

- Worked with pre-college students attending university on the GI bill to develop the writing skills and confidence needed to succeed in the academic environment of college;
- Led 1-on-1 and pair teaching sessions as students developed an original, analytical essay on the central questions of American democracy.