Extended Publication List[1]

Gizem Karaali

1. Theses and Dissertations

1.1- Karaali, G.; "*r-matrices on Lie Superalgebras*", Ph.D. Thesis, University of California, Berkeley, 2004.

Synopsis: A well-known result of Belavin and Drinfeld on the solutions of the classical Yang-Baxter equation from the 1980s was extended in the late 1990s by Etingof, Varchenko, and Schiffmann to the context of the dynamical Yang-Baxter equation. The work in my thesis explores to what extent these results hold when the underlying symmetry objects are Lie superalgebras as opposed to Lie algebras. My results appeared eventually as the journal article **3.1** and the conference proceedings article **3.2**.

2. Book-Length Manuscripts

2.1- Tunstall, L., Karaali, G., Piercey, V., editors; *Shifting Contexts, Stable Core: Advancing Quantitative Literacy in Higher Education*, forthcoming in the MAA Notes series of MAA Press, an imprint of the American Mathematical Society, 2018.

Synopsis: This is an edited volume of articles exploring the changing and evolving landscape of quantitative literacy, both in scholarship and practice. The manuscript consists of twenty-one articles as well as a foreword, written by Susan L. Ganter, and several introductory segments written by the editors. All contributions underwent careful refereeing, and the final book will be coming out before the end of 2018.

2.2- Barcelo, H., Karaali, G., Orellana, R., editors; *Recent Trends in Algebraic Combinatorics*, forthcoming in the Association for Women in Mathematics series, Springer, Cham, 2019.

Synopsis: This is a collection of survey articles on many of the interesting and open research questions of algebraic combinatorics. As editors we sought out the authors of this volume — several writers known for their expository skills as well as a few junior researchers with active research programs who were willing to share their knowledge — and worked closely with them through a rigorous peer review process to ensure that the resulting essays would be solid contributions to the field. The manuscript includes ten survey articles, and is currently under production.

2.3- Karaali, G., Khadjavi, L., editors; *Mathematics for Social Justice: Resources for the College Classroom*, in progress and under contract with the American Mathematical Society.

Synopsis: This is an edited volume of articles and classroom resources, accepted for publication in the MAA Classroom Resource Materials series of MAA Press, an imprint of the American Mathematical Society. As editors we solicited a wide range of contributions from

[1] In collaborative projects in pure mathematics, it is customary to list author names in alphabetical order, with no implied weighting of the relative distribution of author contributions. In the following, any list of coauthors listed in alphabetical ordering follows this tradition.

mathematics instructors who have expertly incorporated social justice issues into their mathematics classroom work. The manuscript thus contains five essays written by individuals who have thought carefully about the benefits and pitfalls of engaging mathematically with social issues in the classroom, fourteen classroom modules that can be adopted within standard implementations of courses ranging from calculus to discrete math to differential equations, and an introductory essay by the editors situating the text in its context by providing a user-friendly account of just what is involved in "teaching mathematics for social justice". The manuscript is now undergoing final formatting edits and will most likely appear in 2019.

2.4- Karaali, G., Khadjavi, L., editors; *Mathematics for Social Justice: Focusing on Quantitative Reasoning and Statistics*, in progress and under contract with the American Mathematical Society.

Synopsis: This is the second installment of my joint project with Khadjavi on creating classroom resources for instructors who want to "teach mathematics for social justice". In this volume we collected together seventeen classroom modules in topics that can be explored in a statistics or quantitative reasoning course. Our introductory essay situates this volume in the context of the whole project and our epilogue explores further directions where this project might (and hopefully will) grow. The manuscript is still under revision and the publisher expects the final product to appear in 2020. (Our contract stipulates a final manuscript submission date of September 1, 2019, but we expect to beat that deadline.)

2.5- Karaali, G.; *Representation Theory: A Capstone Course*, manuscript in preparation (currently aiming for 400 pages; a 300-page partial draft is included in my portfolio).

Synopsis: In this book, I explore the fundamental methods of representation theory for an undergraduate audience. The text begins with the representation theory of finite groups. Topics covered in this portion of the text include group rings, characters, orthogonality relations, induced representations, applications of representation theory, and other select topics from module theory. Because in today's research world, the finite group picture is almost always augmented (and occasionally even superseded) by the representation theory of infinite continuous groups, this text also offers an intuitive introduction to Lie theory and the relevant representation theory. I am in ongoing communication with the acquisitions editor of an academic publisher about this manuscript, and have been working to apply his recommendations to it before I formally submit it for review.

3. Papers and Preprints (peer reviewed or submitted for peer review)

3.1- Karaali, G.; "*Constructing $r-$matrices on Simple Lie Superalgebras*", Journal of Algebra, Volume **282** Issue 1 (1 December 2004), pages 83–102.

Synopsis: This is one of the two papers that contain the results of my dissertation (**1.1**). In particular in this paper I construct $r-$matrices for simple Lie superalgebras with non-degenerate Killing forms using Belavin-Drinfeld type triples. This construction gives us the standard $r-$matrices and some nonstandard ones. The main result of the paper is a construction theorem, but I also announce the existence of a counterexample that ensures that a complete generalization of the Belavin-Drinfeld result will not work. This example is explored in detail in article **3.2**.

3.2- Karaali, G.; "*A New Lie Bialgebra Structure on* $\mathfrak{sl}(2,1)$", in *Representations of algebraic groups, quantum groups, and Lie algebras*, edited by Georgia Benkart, Jens C. Jantzen, Zongzhu Lin, Daniel K. Nakano, and Brian J. Parshall (Contemporary Mathematics **413**, Amer. Math. Soc., Providence, RI, 2006), pages 101–122.

Synopsis: The second paper coming from my doctoral dissertation, this paper explores in detail the counterexample announced in the article **3.1**. More specifically in this paper I show that unlike in the Lie algebra case, there are normalized non-degenerate (non-skew-symmetric) r-matrices on simple Lie superalgebras with non-degenerate Killing forms that cannot be obtained using Belavin-Drinfeld type data. I explicitly construct such an r-matrix on the Lie superalgebra $\mathfrak{sl}(2,1)$ and describe the Lie bialgebra structure related to this r-matrix, showing that it makes $\mathfrak{sl}(2,1)$ into the Drinfeld double of a four-dimensional subalgebra.

3.3- Karaali, G.; "*Super Solutions of the Dynamical Yang-Baxter Equation*", Proceedings of the American Mathematical Society, Volume **134** Issue 9 (September 2006), pages 2521–2531.

Synopsis: This paper continues my pursuit of a superization of various aspects of the theory of quantum groups. In particular in this paper I analyze the non-graded results of Etingof and Varchenko on the solutions of the classical dynamical Yang-Baxter equation and extend their constructions to the super case. The main result is a classification of super dynamical $r-$matrices with zero weight.

3.4- Karaali, G.; "*Dynamical Quantum Groups - The Super Story*", in *Hopf algebras and generalizations*, edited by Louis H. Kauffman, David E. Radford, and Fernando J. 0. Souza (Contemporary Mathematics **441**, Amer. Math. Soc., Providence, RI, 2007), pages 19–52.

Synopsis: This is a review paper combined with a few new results related to the study of quantum groups in the super setting. In particular, I provide an overview of results about solutions of the Yang-Baxter equations in the super setting and begin to develop a super analog of the theory of dynamical quantum groups.

3.5- Karaali, G.; "*Word problems: Reflections on embedding quantitative literacy in a calculus course*"; Numeracy (journal of the National Numeracy Network), Volume **1** Issue 2 (July 2008), Article 6. Available online at `http://services.bepress.com/numeracy/vol1/iss2/art6`

Synopsis: This article originated from my experiences teaching Calculus for Social and Life Sciences I-II at the University of California Santa Barbara (2004-2006). My reflections on the course led me to believe that, though it was labeled as a calculus course, its main goal was to serve as a Quantitative Literacy (QL) course. This paper thus ended up being a case study of how a traditional mathematics course sequence intended for students majoring in social and life sciences may be modified and adapted to at least partially fulfill the need in the absence of a stand-alone QL program. Inspired by the emphasis of the UCSB course series on word problems, I argued that various levels of word problems may be used successfully to satisfy QL goals. Descriptions of QL mainly focus on going from the mathematical data and presentations to an understanding of the real world. In this note I argued that word problems go in the opposite direction and, in some sense, close the loop in QL. This was my first paper in QL and in a pedagogical perspective, and led me to develop a more scholarly stance with respect to my teaching.

3.6- Buhl, G., Karaali, G.; "*Spanning sets for Moebius vertex algebras satisfying arbitrary difference conditions*", Journal of Algebra, Volume **320** Issue 8 (15 October 2008), pages 3345–3364.

Synopsis: This paper came out of a conversation I had with Buhl on similarities and differences between the representation theories of Lie superalgebras and vertex operator algebras. The specific question answered in the paper continues Buhl's prior work related to the spanning sets for vertex operator algebras satisfying difference-zero and difference-one conditions. In this paper, we show that for a suitably chosen generating set, any N-graded Moebius vertex algebra is spanned by monomials satisfying a difference-N ordering condition. This paper also got me thinking about bases and generators for various algebraic objects, leading me eventually to algebraic combinatorics.

3.7- Karaali, G.; "*On Hopf Algebras and Their Generalizations*", Communications in Algebra, Volume **36** Issue 12 (December 2008), pages 4341–4367.

Synopsis: While working on article **3.4**, I found that there were many different possible paths one could take to develop a feasible theory of super dynamical quantum groups. To organize my thoughts I wrote this survey paper on Hopf algebras and their generalizations. In particular, I compared and contrasted three well-studied generalizations (quasi-Hopf algebras, weak Hopf algebras, and Hopf algebroids), and two newer ones (Hopf monads and hopfish algebras). Each of these notions was originally introduced for a specific purpose within a particular context; my approach of course favored applicability to the theory of dynamical quantum groups. The MathSciNet review of the article states "the article is a joy to read. It is a very gentle introduction to several notions which are not easy to deal with, especially for newcomers. If the reader of this review is looking for a map to begin understanding the world behind Hopf algebras, this reviewer firmly recommends the paper as a starting point." After article **3.1**, this is the second most cited paper I wrote as the sole author (according to Google Scholar).

3.8- Karaali, G., Choi, P.I., Owsley Sood, S., Grosfils, E.B.; "*Envisioning a Quantitative Studies Center: A Liberal Arts Perspective*"; Numeracy (journal of the National Numeracy Network), Volume **3** Issue 1 (January 2010), Article 4.[2] Available online at `http://services.bepress.com/numeracy/vol3/iss1/art4`

Synopsis: This paper resulted from the work of an ad hoc Pomona College committee assigned with the task of investigating the feasibility of founding a quantitative studies center on our campus. Our efforts involved analysis of data collected through a faculty questionnaire, discipline-specific input obtained from each departmental representative, and a survey of what some of our peer institutions are doing to tackle these issues. Through our explorations, we identified three critical needs where quantitative support would be most useful on our campus: tutoring and mentoring for entry-level courses; support for various specialized and analytic software tools for upper-levels; and a uniform basic training for student tutors and mentors. We surmised that our challenges can be mitigated effectively via the formation of a well-focused and -planned quantitative studies center. Our process, our findings, and our final proposal became the foundation of the College's efforts to fund and found the Quantitative Skills Center in Fall 2013.

[2] In this project, my colleagues insisted that we use authorship order to signify the extent of individual contributions.

3.9- Karaali, G., Yoshiwara, B.; "*Life After Wolfram|Alpha: What You (and Your Students) Need to Know*; Loci (January 2010), Available online at `http://dx.doi.org/10.4169/loci003365`

Synopsis: Yoshiwara and I got into this project through a common interest in using free technological tools for our mathematics work in and outside of the classroom. This article was one of two that we wrote together to introduce WolframAlpha to mathematics instructors; also see article **7.3**. In the paper we introduced several basic features of Wolfram|Alpha, provided examples, and discussed along the way how this new technology can influence what we do in our classrooms. We used the online format of the journal *Loci* effectively to encourage readers to engage with WolframAlpha.

3.10- Fleming, P.S., Garcia, S.R., Karaali, G.; *Classical Kloosterman sums: representation theory, magic squares, and Ramanujan multigraphs*, Journal of Number Theory, Volume **131** Issue 4 (April 2011), pages 661–680.

Synopsis: This paper grew out of a week-long AIM workshop (Research Experiences for Undergraduate Faculty - REUF 2009), where Fleming, Garcia, and I were introduced, by our team mentor Phil Kutzko, to an interesting representation-theoretic construction with number-theoretic connections. Our work continued after the week at AIM, and in the end resulted in a comprehensive study of the representation theory of a certain finite group for which Kloosterman sums appear as character values. We were thus able to explicitly construct a family of commuting hermitian matrices which have Kloosterman sums as eigenvalues. We showed that these matrices satisfy a number of "magical" combinatorial properties and encode various arithmetic properties of Kloosterman sums. We also explored them as adjacency matrices for multigraphs which display Ramanujan-like behavior. See article **7.12**, where I wrote about this work and some of the followup work that resulted from two seemingly unrelated AIM workshops.

3.11- Aguiar, M., Andre, C., Benedetti, C., Bergeron, N., Chen, Z., Diaconis, P., Hendrickson, A., Hsiao, S. K., Isaacs, I. M., Jedwab, A., Johnson, K., Karaali, G., Lauve, A., Le, T., Lewis, S., Li, H., Magaard, K., Marberg, E., Novelli, J-C., Pang, A., Saliola, F., Tevlin, L., Thibon, J-Y., Thiem, N., Venkateswaran, V., Vinroot, C. R., Yan, N., Zabrocki, M.; "Supercharacters, symmetric functions in noncommuting variables (extended abstract)", DMTCS Proceedings (FPSAC 2011 Reykjavik, Iceland), **AO**, 2011, 3–14. Available at `https://www.dmtcs.org/dmtcs-ojs/index.php/proceedings/article/view/dmAO0102.1.html`.

Synopsis: This is the extended abstract submitted to the Proceedings of the 23rd International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2011) describing the work done in a 2010 AIM workshop that brought together researchers working with Hopf algebras and researchers working on supercharacter theories, a young and active subfield of algebraic combinatorics / combinatorial representation theory. A more complete presentation of these results can be found in article **3.16**.

3.12- Hsiao, S.K. and Karaali, G.; "*Multigraded combinatorial Hopf algebras and refinements of odd and even subalgebras*", Journal of Algebraic Combinatorics, Volume **34** Number 3 (November 2011), pages 451–506.

Synopsis: This paper grew out of a conversation with Hsiao on the ways combinatorists work with Hopf algebras. Hopf algebras were solely representation-theoretic objects for me, till this collaboration. Through this work I came to appreciate their versatility in algebraic combinatorics. In this paper we developed a theory of multigraded (i.e., N^l-graded) combinatorial Hopf algebras modeled on the theory of graded combinatorial Hopf algebras of Aguiar, Bergeron, and Sottile [Compositio Mathematica **142** (2006), 1–30]. In particular we introduced the notion of canonical k-odd and k-even subalgebras associated with any multigraded combinatorial Hopf algebra, extending simultaneously the work of Aguiar *et al.* and Ehrenborg. The paper also contains specific categorical results for higher level quasisymmetric functions, several basis change formulas, and a generalization of the descents-to-peaks map.

3.13- Karaali, G.; "*An Evaluative Calculus Project: Applying Bloom's Taxonomy to the Calculus Classroom*"; PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies, Volume **21** Issue 8 (November 2011), pages 719–731.

Synopsis: Bloom's taxonomy describes and classifies domains of learning and levels of competency. In this note I describe a calculus capstone project meant to address the sixth and arguably the highest goal in the cognitive domain according to this taxonomy: evaluation. Although it may be natural to assume that mathematics is value-free as a discipline and thus the mathematics classroom can and should be exempt from focusing on the evaluative aspect of higher level cognitive processing, I surmise that we as mathematics instructors can and should consider incorporating such components to our courses. The note also includes a brief summary of my observations and a discussion of my experience from when I used the project described here in my Calculus I course during the Fall 2008 semester. This is my third most-cited single-author paper (according to Google Scholar).

3.14- Karaali, G.; "*On the quantization of zero-weight super dynamical r-matrices*", Proceedings of the American Mathematical Society, Volume **140** Issue 1 (January 2012), pages 7–20.

Synopsis: In this paper I continue my work in superizing the various aspects of the theory of quantum groups. In particular I explicitly quantize all zero-weight super dynamical r-matrices (with any coupling constant) and answer some questions about super dynamical R-matrices, offering along the way some support for a particular interpretation of the super Hecke condition.

3.15- Aksoy, S., Azzam, A., Coppersmith, C., Glass, J., Karaali, G., Zhao, X., Zhu, X., *A Cost-Minimizing Algorithm for School Choice*, ISAIM 2012 (International Symposium on Artificial Intelligence and Mathematics, Fort Lauderdale, Florida, USA, January 9-11, 2012) Proceedings, 2012. Available at `https://www.cs.uic.edu/bin/view/Isaim2012/AcceptedPapers`.

Synopsis The school choice problem concerns the design and implementation of matching mechanisms that produce school assignments for students within a given public school district. In this paper which represents the first part of the work of a 2010 REU project, my coauthors and I propose expanding upon the desirability notions for a given assignment mechanism by focusing on honoring student preferences. In particular we define two new student-optimal criteria and then use these criteria to adapt a well-known combinatorial optimization technique (Hungarian algorithm) to the problem. Five of the seven authors of this paper were undergraduates when we wrote the paper.

3.16- Aguiar, M., Andre, C., Benedetti, C., Bergeron, N., Chen, Z., Diaconis, P., Hendrickson, A., Hsiao, S. K., Isaacs, I. M., Jedwab, A., Johnson, K., Karaali, G., Lauve, A., Le, T., Lewis, S., Li, H., Magaard, K., Marberg, E., Novelli, J-C., Pang, A., Saliola, F., Tevlin, L., Thibon, J-Y., Thiem, N., Venkateswaran, V., Vinroot, C. R., Yan, N., Zabrocki, M.; *Supercharacters, symmetric functions in noncommuting variables, and related Hopf algebras*, Advances in Mathematics, Volume **229** Issue 4 (1 March 2012), pages 2310–2337.

Synopsis: This paper developed during a focused research week at the American Institute of Mathematics in May 2010. The main results presented here were proved as a group during that meeting. Also see articles **3.11** and **7.12**. In the paper we identify two seemingly disparate structures: supercharacters, a useful way of doing Fourier analysis on the group of unipotent uppertriangular matrices with coefficients in a finite field, and the ring of symmetric functions in noncommuting variables. Each is a Hopf algebra and the two are isomorphic as such. This allows developments in each to be transferred. The identification suggests a rich class of examples of combinatorial Hopf algebras. This paper is the most cited paper with my name on it (according to Google Scholar).

3.17- Karaali, G.; *The Brave New World of Open Access & Creative Commons: a Humanistic Experiment in Mathematical Publishing*, Proceedings of the JMM/AMS Special Session on Topics and Issues in Electronic Publishing (San Diego, 9–10 January 2013), pages 11–31. The Proceedings volume is available online at `http://www.emis.de/proceedings/TIEP2013/`.

Synopsis: In this note I make a case for open access and creative commons licensing in the context of mathematical scholarship. In order to provide the context of the argument, I describe several aspects of my own experiences with *Journal of Humanistic Mathematics*.

3.18- Karaali, G.; *The Genius as a Characterization of the Creative Spirit in Mathematics and the Arts*, in *Proceedings of Bridges 2014: Mathematics, Music, Art, Architecture, Culture*, edited by Gary Greenfield, George Hart, and Reza Sarhangi (Tessellations Publishing, Phoenix, 2014), pages 413–416.

Synopsis: In this note I explore the similarities between the purported roles of genius in the worlds of mathematics and the arts, and then focus on the possible disadvantages of this stereotype. Also see article **7.24**, where I pursue a similar thread of thought.

3.19- Karaali, G.; *Can Zombies Write Mathematical Poetry? Mathematical poetry as a model for humanistic mathematics*, Journal of Mathematics and the Arts, Volume **8** Issue 1-2 (2014), pages 38–45.

Synopsis: In this article, I share some thoughts on the creative component of mathematics and propose that mathematical poetry is a perfect model and ambassador for a more humanistic understanding of mathematics. The narrative in the article intertwines my personal journey towards my discovery of mathematical poetry (culminating in an account of how I finally bit the bullet and wrote my own) with some musings on the role mathematical poetry may play in the classroom as well as the public sphere. At the end of 2014, the publisher (Taylor and Francis) announced that this paper was one of the six most read articles of 2014 on mathematics and its relationship to the arts; see `http://explore.tandfonline.com/page/est/mathematics-statistics-most-read-2014/mathematics-and-the-arts-top-10-2014` for details. Also see article **7.22**.

3.20- Fowler, C.F., Garcia, S.R., Karaali, G.; *Ramanujan sums as supercharacters*, Ramanujan Journal, Volume **35** Issue 2 (November 2014), pages 205–241.

Synopsis: This paper grew out of my work with Garcia exploring supercharacter theories of certain finite groups, and a Pomona College senior thesis student's interest in abstract algebra work (Fowler). Garcia and I got into supercharacter theory after my participation in a 2010 AIM workshop, which helped us finally figure out what was going on with the large matrices with redundancies that appeared in article **3.10**; see article **7.12** that explains the development of this new dimension of my research agenda. In this paper we used the theory of supercharacters to derive the fundamental algebraic properties of Ramanujan sums. This machinery often yielded one-line proofs of difficult identities and many novel formulas. In addition to exhibiting a new application of supercharacter theory, we saw this article also as a blueprint for future work since some of the abstract results we developed here were obviously applicable in much greater generality.

3.21- Brumbaugh, J.L., Bulkow, M., Fleming, P.S., Garcia, L.A., Garcia, S.R., Karaali, G., Michal, M., Turner, A.P., Suh, H.; *Supercharacters, exponential sums, and the uncertainty principle*, Journal of Number Theory, Volume **144** (November 2014), pages 151–175.

Synopsis: This paper generalized some of the work in article **3.20** and developed a more robust and general framework for the types of number-theoretic problems supercharacter theories could address, along the way also explaining the mysteries of the matrices in article **3.10**, see article **7.12**. In particular, in this paper, we studied supercharacter theories on $(\mathbb{Z}/n\mathbb{Z})^d$ induced by the actions of certain matrix groups, demonstrating that a variety of exponential sums of interest in number theory (e.g., Gauss, Ramanujan, Heilbronn, and Kloosterman sums) arise in this manner. We also developed a generalization of the discrete Fourier transform, in which supercharacters play the role of the Fourier exponential basis, and provided a corresponding uncertainty principle and computed the associated constants in several cases. Four of the authors of this paper were undergraduate students at the time of the writing of the paper.

3.22- Karaali, G.; *Metacognition in the Classroom: Motivation and Self-Awareness of Mathematics Learners*, PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies, Volume **25** Issue 5 (May 2015), pages 439–452.

Synopsis: Metacognition as a dimension of learning ranks highest in the revised Bloom's Taxonomy of cognitive tasks. In this paper I illustrate how it can be incorporated into a repeated exercise in the mathematics classroom, through a case study in the context of a liberal arts mathematics course (Math One). I also argue for a cyclical, two-way relationship between metacognition and motivation, and suggest other possible contexts suitable for the activities I describe. This article was announced as one of the most read articles in mathematics education in 2015 by its publisher (Taylor & Francis), and a 2018 review of work in metacognition, forthcoming in the journal *Educational Review* ("Metacognition in schools: what does the literature suggest about the effectiveness of teaching metacognition in schools?" by John Perry, David Lundie & Gill Golder) referred to it to conclude that "The most well-established research concerns the relationship between metacognition and motivation, which generally suggests that there is a symbiotic link between the two: greater motivation leads to improved metacognition, which leads to greater motivation, and so on."

3.23- Aksoy, S., Azzam, A., Coppersmith, C., Glass, J., Karaali, G., Zhao, X., Zhu, X., *Coalitions and Cliques in the School Choice Problem*, Involve, A Journal of Mathematics, Volume 8 Issue 5 (October 2015), pages 801–823.

Synopsis: This paper represents part II of the results from my 2010 REU project; the first part appeared as article **3.15**. In this paper, we describe two efficiency adjustments to the well-known Gale Shapley Student Optimal Stable Matching Mechanism (SOSM), the most efficient stable mechanism proposed so far as a solution to the school choice problem. In one we create possibly artificial coalitions among students where some students modify their preference profiles in order to improve the outcome for other students. Our second approach involves trading cliques among students where those involved improve their assignments by waiving some of their priorities. We also discuss the practical implications and limitations of our approach. Five of the authors of this paper were undergraduates at the time of the REU project and three were in graduate school by the time this paper came out.

3.24- Karaali, G., Villafane Hernandez, Edwin H., Taylor, Jeremy A.; *What's in a Name? A Critical Review of Quantitative Literacy, Numeracy, and Quantitative Reasoning*, Numeracy (journal of the National Numeracy Network), Volume **9** Issue 1 (January 2016), Article 6. Available online at `http://scholarcommons.usf.edu/numeracy/vol9/iss1/art2/`

Synopsis: This article, which reflects work done with two Pomona College students, aims to bring together various threads in the eclectic literature that make up the scholarship around the theme of Quantitative Literacy. In investigating the meanings of terms like "quantitative literacy", "quantitative reasoning", and "numeracy", we seek common ground, common themes, common goals and aspirations of a community of practitioners. In the end, we argue that there is indeed a common thread among all the terms involved, that of a competence in interacting with myriad mathematical and statistical representations of the real world, in the contexts of daily life, work situations, and the civic engagement. Furthermore we propose that the knowledge content captured by the individual terms can be placed on a continuum (statistics-data-arithmetic-mathematics-logic). This is my most cited paper in quantitative literacy (according to Google Scholar).

3.25- Karaali, G.; *A Humanistic Reading Component for an Introduction-to-Proofs Course*, in *Beyond Lecture: Techniques to Improve Student Proof-Writing Across the Curriculum*, edited by Rachel Schwell, Aliza Steurer, and Jennifer Franko Vasquez (Mathematical Association of America, Washington DC, 2016), pages 123-133.

Synopsis: I often use a reading component focused on the nature of mathematical proof in my Introduction to Analysis course (Math 101), which is a transition-to-upper-division-math course that emphasizes writing proofs. Students are expected to read a variety of articles and essays about proofs and then create a joint document (currently using a class wiki) that allows them to consider a range of perspectives about what makes a mathematical proof work. The collaborative nature of the project seems to improve student engagement and the quality of student contributions. At the end students leave with a more nuanced understanding of proof. In this note I describe the project, my reasons for using it, and what my students appear to get out of it. Any instructor who has access to some technology might be able to incorporate this project with a class size ranging from 10 to 40.

3.26- Karaali, G.; *An "Unreasonable" Component to a Reasonable Course: Readings for a Transitional Class*, in *Using the Philosophy of Mathematics in Teaching Undergraduate Mathematics*, edited by Bonnie Gold, Carl Behrens, and Roger Simons (Mathematical Association of America, Washington DC, 2017), pages 107–118.

Synopsis: In this paper I describe a reading component that I incorporate into a traditional linear algebra course (Math 60) focusing on "the unreasonable effectiveness of mathematics", a phrase made famous by Eugene Wigner's eponymous article. In developing the component, my first goal was to keep my students connected to the vital fact that mathematics is and has historically been essential to our understanding of the universe. My second goal was to introduce a liberal arts (more specifically, a philosophy) component to a rather straightforward mathematics course.

3.27- Karaali, G., Khadjavi, L.; *Unnatural Disasters: Two Calculus Projects for Instructors Teaching Mathematics for Social Justice*, accepted for publication by PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies, published online at `https://www.tandfonline.com/doi/abs/10.1080/10511970.2018.1472683`.

Synopsis: Khadjavi and I have been working on various ways to incorporate social justice issues into the college mathematics classroom; see manuscripts **2.3**-**2.4** described earlier. In this paper we provide context and motivation for an instructor to use real-life examples in the calculus classroom. To this end we describe two specific project ideas, one related to the devastating impact of methylmercury fungicide in a grain seed supply and the other to a catastrophic methane leak. By using calculus in contexts that have social justice implications, we hope to empower students to reason for themselves, to use mathematics as a powerful tool to deepen their understanding of the world, and ultimately, to effectively confront the challenges society faces.

3.28- Karaali, G.; *On Grades and Instructor Identity: How Formative Assessment Saved me from a Midlife Crisis*, accepted for publication by PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies, published online at `https://www.tandfonline.com/doi/abs/10.1080/10511970.2018.1456495`.

Synopsis: In recent years, I found myself with an almost pathological resistance to grading. Here I explore the reasons why and describe how I eventually recovered. In particular, I propose that although grading, or more explicitly, effective assessment of student learning, is a challenging component of a mathematics instructors job description, reflective use of formative assessment can substantially relieve the pressure, as it allows the instructor to focus on what matters most: student learning and growth. To this end, I describe my experiences with formative assessment in a diverse selection of courses (ranging from calculus to introduction to proofs to mathematics for liberal arts). I conclude that formative assessment can help an instructor move toward a more intentional pedagogical stance, and a more constructive professional identity. See blog post **5.11** for an extended exploration of instructor vulnerability.

3.29- Gangl, H., Karaali, G., Lee, W.; *Homophonic Quotients of Linguistic Free Groups: German, Korean, and Turkish*, accepted for publication, to appear in Involve, A Journal of Mathematics, available from authors upon request.

Synopsis: Initiated during a summer reading course with Lee, the work in this paper involves exploring languages and their writing systems through an algebraic lens. In 1993, the homophonic quotient groups for French and English (the quotient of the free group generated by the French (respectively English) alphabet determined by relations representing standard pronunciation rules) were explicitly characterized. In this paper we apply the same methodology to three different language systems: German, Korean, and Turkish. We argue that our results point to some interesting differences between these three languages (or at least their current script systems).

3.30- Karaali, G.; *On Animals, QL Converts, and Transfer: An Interview with Len Vacher*, in *Shifting Contexts, Stable Core: Advancing Quantitative Literacy in Higher Education*, edited by Tunstall, L., Karaali, G., Piercey, V., forthcoming.

Synopsis: This is the final chapter of the book **2.1**, and contains an interview I had with Len Vacher, the senior editor of *Numeracy*, the flagship journal of the National Numeracy Network, and the sole publication outlet exclusively dedicated to scholarship on quantitative literacy (QL). This was a fruitful conversation, quite eclectic and broad in its themes. As the final chapter of the book, it points toward possible future developments in QL scholarship. I also learned through this experience that transcribing an interview is hard work!

3.31- Glass, J., Karaali, G.; *Matching Kids to Schools: The School Choice Problem*, in *Mathematics for Social Justice: Resources for the College Classroom*, edited by Karaali, G., Khadjavi, L., forthcoming.

Synopsis: Inspired by our experience with our REU project from 2010 (which led to articles **3.15**, **3.23**, and **3.32**), Glass and I decided that bringing the school choice problem into the college classroom could be beneficial in multiple ways. To this end we contributed this chapter to the upcoming book **2.3**. This paper introduces a two-sided matching problem that confronts the challenge of finding fair ways to distribute students among the schools in a large school district, given constraints on student preferences and priorities such as proximity, special programs, and sibling placement. The module has no prerequisites and can be used in a course on discrete mathematics, or, with ample guidance, in a liberal arts mathematics setting. Throughout the project students are encouraged to consider what makes a matching algorithm fair and seek ways to encode these expectations in mathematical terms. Several exercises with solutions are provided.

3.32- Aksoy, S., Azzam, A., Coppersmith, C., Glass, J., Karaali, G., Zhao, X., Zhu, X.; *School Choice as a One-Sided Matching Problem: Cardinal Utilities and Optimization*, preprint.

Synopsis: The third part of the results of my 2010 REU project (see articles **3.15** and **3.23** for related prior work), this paper explores a class of one-sided, cardinal utility maximizing matching mechanisms focused exclusively on student preferences. We adapt a well-known combinatorial optimization technique (the Hungarian algorithm) as the kernel of this class of matching mechanisms. We find that, while such mechanisms can be adapted to meet desirable criteria not met by any previously employed mechanism in the school choice literature, they are not strategyproof. We discuss the practical implications and limitations of our approach at the end of the article. Partially due to the priorities of the author team, this paper has not yet found a home, but as a preprint, it is still available for other scholars and followup work.

3.33- Garcia, S.R., Karaali, G., Katz, D.J.; *On Chebotarëv's nonvanishing minors theorem and the Biró–Meshulam–Tao discrete uncertainty principle*, submitted for publication, available from authors upon request.

Synopsis: Chebotarëv's theorem says that every minor of a discrete Fourier matrix of prime order is nonzero. In this paper, we prove a generalization of this result that includes analogues for discrete cosine and discrete sine matrices as special cases. We then establish a generalization of the Biró–Meshulam–Tao uncertainty principle to functions with symmetries that arise from certain group actions and twists. We then show that our result is best possible and always yields a lower bound at least as strong as Biró–Meshulam–Tao. The work in this paper was initiated by Garcia's interest in the various proofs of Chebotarëv's theorem, and Katz and I got involved due to the connections with discrete Fourier transforms and uncertainty principles (cf. article **3.21**).

3.34- Karaali, G., Yih, S.; *The Magic of the Number Three: Three Special Cases in Abstract Algebra*, submitted for publication, available from the authors upon request.

Synopsis: This article came out of some summer work Yih did with me. In this article we explore three specific statements from abstract algebra that involve the number three, whose proofs are explanatory in the sense of Steiner ("Mathematical explanation", *Philosophical Studies*, Volume **34** (1978), pages 135–151). We propose possible ways to use these statements and others similar to them in an abstract algebra course emphasizing proofs, or in an introduction to proofs course based on group theory.

3.35- Karaali, G.; "Emotional Labor in Mathematics: Reflections on Mathematical Communities, Mentoring Structures, and EDGE", submitted for publication, available from the author upon request.

Synopsis: Terms such as "affective labor" and "emotional labor" pepper feminist critiques of the workplace. Though there are theoretical nuances between the two phrases, both kinds of labor involve the management of emotions and are deemed to be feminized; some acts associated with these constructs involve caring, listening, comforting, reassuring, and smiling. In this article I explore the different ways many of us are called to provide emotional labor in the discipline of mathematics. My goal is to investigate the various dimensions of emotional labor that fashion our engagement with it in the context of academic mathematics. In particular I surmise that mathematical communities and mentoring structures such as EDGE help diminish some of the negative aspects of such labor while also accentuating the positives. I wrote this article with the hope that it would be included in the upcoming volume *A Celebration of EDGE*, and am waiting to hear from the editors about reader reports. In the meantime I already received some constructive comments from colleagues and intend to revise it extensively before it is out.

4. Book Reviews

4.1- Karaali, G.; *Philosophy of Science after Feminism by Janet Kourany*, extended book review, Association for Women in Mathematics Newsletter, Volume **42** Number 1 (January-February 2012), pages 8–10.

4.2- Karaali, G.; *The Best Writing on Mathematics: 2010, Mircea Pitici, ed.*, brief book review, Mathematics Teacher, Volume **105** Number 9 (May 2012), page 717.

4.3- Karaali, G.; *Encyclopedia of Mathematics and Society, by Sarah J. Greenwald and Jill E. Thomley*, extended book review, College Mathematics Journal, Volume **44** Number 4 (September 2013), pages 332–335.

4.4- Karaali, G.; *Mathematics in Popular Culture: Essays on Appearances in Film, Fiction, Games, Television and Other Media, edited by Jessica K. Sklar and Elizabeth S. Sklar; Loving+Hating Mathematics: Challenging the Myths of Mathematical Life, by Reuben Hersh and Vera John-Steiner; Mathematicians: An Outer View of The Inner World, by Mariana Cook*, extended book review, Association for Women in Mathematics Newsletter, Volume **43** Number 6 (November-December 2013), pages 22–25.

4.5- Karaali, G.; *Really Big Numbers, by Richard Evan Schwartz; The Boy Who Loved Math: The Improbable Life of Paul Erdős, by Deborah Heiligman; The Short Seller, by Elissa Brent Weissman*, extended book review, Association for Women in Mathematics Newsletter, Volume **45** Number 4 (July-August 2015), pages 17–19.

4.6- Karaali, G.; *The Problems of Contemporariness and Voice: Review of Literacy & Mathematics: A Contemporary Approach to Quantitative Literacy, by Jay P. Abramson and Matthew A. Isom (2005)*, extended book review, Numeracy, Volume **9** Issue 2 (July 2016), Article 11. Available at: `http://scholarcommons.usf.edu/numeracy/vol9/iss2/art11`

4.7- Karaali, G.; *Review of Mathematics and Art: A Cultural History, by Lynn Gamwell (2015)*, extended book review, Journal of Mathematics and the Arts, Volume **10** Issue 1-4 (2016), pages 87–92.

4.8- Karaali, G.; *When Critical Multiculturalism Meets Mathematics: A Mixed Methods Study of Professional Development and Teacher Identity, by Patricia L. Marshall, Jessica T. DeCuir-Gunby, and Allison W. McCulloch (2015)*, brief book review, Mathematics Teacher, Volume **111** Number 1 (September 2017), pages 78–79.

4.9- Karaali, G.; *Rehumanizing Mathematics for Black, Indigenous, and Latinx Students, edited by Imani Goffney and Rochelle Gutiérrez) (2018)*, brief book review, Mathematics Teacher, to appear.

4.10- Karaali, G.; *The Great Formal Machinery Works: Theories of Deduction and Computation at the Origins of the Digital Age by Jan Von Plato (2017)*, brief book review, Mathematics Teacher, to appear.

4.11- Karaali, G.; *Reading About Ada: Children's Edition*, extended book review of children's books on Ada Lovelace, commissioned for and to be submitted to Association for Women in Mathematics Newsletter in November 2018.

4.12- Karaali, G.; *Reading About Ada: The Adult Edition*, extended book review of several recent books on Ada Lovelace, commissioned for and to be submitted to Association for Women in Mathematics Newsletter in January 2019.

5. Blog Posts and Contributions to Other Online Projects

5.1- Karaali, G.; *Grandma Got STEM! Selma Karaali and Artemis Karaali*, guest blog entry for Grandma Got STEM, `http://ggstem.wordpress.com/2013/04/11/selma-karaali-and-artemis-karaali/`, posted on April 11, 2013.

Synopsis: Grandma Got STEM is a Web 2.0 project on raising public awareness about stereotypes about gender, age, and maternity embodied in comments about grandmothers. In 2013 I contributed a piece focused on my mother and paternal grandmother.

5.2- Karaali, G.; *The Fundamental Principle of Productivity: What they DON'T teach you in graduate school*, guest blog entry for American Mathematical Society e-Mentoring Network, `http://blogs.ams.org/mathmentoringnetwork/2014/04/07/the-fundamental-principle-of-productivity-what-they-dont-teach-you-in-graduate-school/`, posted on April 7, 2014.

Synopsis: American Mathematical Society hosts a few blogs as a service to the mathematical community. In April 2014 I contributed a post to the e-Mentoring Network blog about basic ideas about academic productivity.

5.3- Karaali, G. (with eight other female faculty); *Vocalized: What do you wish you could tell your women students?*, `http://www.facebook.com/PomonaWomensUnion/albums/10152506914949180/`, posted on April 28, 2014.

Synopsis: This was a short blurb I contributed to a project of the Pomona College Women's Union on advice I would like to share with my women students.

5.4- Karaali, G.; *Why You Need a Summer Plan*, guest blog entry for American Mathematical Society e-Mentoring Network, `http://blogs.ams.org/mathmentoringnetwork/2014/05/23/why-you-need-a-summer-plan/` posted on May 23, 2014.

Synopsis: This was my second contributed post to the e-Mentoring Network blog about academic productivity.

5.5- Karaali, G.; *Math Talk: Preparing Your Conference Presentation*, guest blog entry for American Mathematical Society e-Mentoring Network, `http://blogs.ams.org/mathmentoringnetwork/2014/08/04/math-talk-preparing-your-conference-presentation/` posted on August 4, 2014.

Synopsis: This post on the e-Mentoring Network blog was about giving a good math talk.

5.6- Karaali, G.; *Women in Maths: Gizem Karaali*, Contribution to the *Women in Maths* Project, `https://www.facebook.com/womeninmaths/photos/a.1573991886146983/1585899764956195/` posted on May 20, 2015.

Synopsis: This was my contribution to the Women in Maths project, a Facebook group project aiming to collect brief bios of living women mathematicians.

5.7- Karaali, G.; *Summer Cleaning: (Digital) Organization Basics for Mathematicians*, guest blog entry for American Mathematical Society e-Mentoring Network, `http://blogs.ams.org/mathmentoringnetwork/2015/05/21/summer-cleaning-digital-organization-basics-for-mathematicians/` posted on May 21, 2015.

Synopsis: This was my third contributed post to the e-Mentoring Network blog about academic productivity.

5.8- Karaali, G.; *The Power of Two: Two Tips for Mathematicians*, guest blog entry for American Mathematical Society e-Mentoring Network, `http://blogs.ams.org/mathmentoringnetwork/2016/03/14/the-power-of-two-two-tips-for-mathematicians/` posted on March 28, 2016.

Synopsis: This was my fourth contributed post to the e-Mentoring Network blog about academic productivity.

5.9- Karaali, G.; *mathematics, bigger on the inside*, contribution to the *Humans of the Academy* Project, `https://humansoftheacademy.com/mathematics-bigger-on-the-inside/`, posted on June 28, 2017.

Synopsis: This was my contribution to the *Humans of the Academy* Project, a short-run web 2.0 project inspired by Humans of New York with the hope of "shedding a light on the ordinary work, aspirations, and concerns of college professors, administrators, and those who have left academia" and "reflecting the diversity that is present in academic spaces around the world".

5.10- Karaali, G. (with Marion D. Cohen, Sarah Glaz, and JoAnne Growney); *AWP Roundtable: "1.41421...: A Conversation Among Math Poets"*, `https://sundresspublications.wordpress.com/2018/04/08/awp-roundtable-1-41421-a-conversation-among-math-poets/`, posted on April 8, 2018.

Synopsis: This was a virtual panel discussion, organized by Marion Cohen, that involved four mathematical poets responding to questions developed by Cohen that aimed to demystify math poetry. It was published on the Sundress Blog, the web supplement of Sundress Publications, a woman-founded, woman-friendly publishing collective founded in 2000.

5.11- Karaali, G.; *On Being Imperfect*, guest blog entry for American Mathematical Society Blog on Teaching and Learning Mathematics, `https://blogs.ams.org/matheducation/2018/07/02/on-being-imperfect/`, posted on July 2, 2018.

Synopsis: This was my first post to appear on the AMS blog on Teaching and Learning Mathematics, and explored the benefits and pitfalls of accepting our imperfections in our teaching lives. More generally it was about being vulnerable as the instructor, an idea I had begun to explore to an extent in article **3.28**.

6. Mathematical Poetry

6.1- Karaali, G.; "The Colors of Math", poem; *The Mathematical Intelligencer*, Volume **35** Issue 1 (March 2013), page 4.

6.2- Karaali, G.; "A Mathematician's Villanelle", poem; *Math Horizons*, Volume **22** Issue 1 (February 2015), page 23. Republished in *Bridges 2016 Poetry Anthology*, edited by Sarah Glaz (Tessellations Publishing, 2016, page 59).

6.3- Karaali, G.; "Math and Metaphor", poem; in *Bridges 2016 Poetry Anthology*, edited by Sarah Glaz, Tessellations Publishing, 2016, page 60.

6.4- Karaali, G.; "A Mother's Math is Never Done", poem; first published on *The Sundress Blog*, April 8, 2018, available at `https://sundresspublications.wordpress.com/2018/04/08/`. Republished in the Special Issue on Mathematics and Motherhood of *Journal of Humanistic Mathematics* (Volume **8** Issue 2 (July 2018), pages 308–309).

6.5- Karaali, G.; "An Invitation", poem; in *Bridges 2018 Poetry Anthology*, edited by Sarah Glaz, Tessellations Publishing, 2018, page 67.

6.6- Karaali, G.; "Math in Seventeen Syllables", poem; in *Bridges 2018 Poetry Anthology*, edited by Sarah Glaz, Tessellations Publishing, 2018, page 67.

6.7- Karaali, G.; "Naive Set Theory", poem; in *Bridges 2018 Poetry Anthology*, edited by Sarah Glaz, Tessellations Publishing, 2018, page 68.

7. Other Writing

7.1- Karaali, G.; "*What I learned from the MAA Digital Library workshop*"; FOCUS (newsletter of the Mathematical Association of America), Volume **26** Issue 9 (December 2006), pages 18–19.

7.2- Bargagliotti, A., Chidambaram, R., Karaali, G.; "*Mathematicians Playing a Role in Math Education: What We Learned at the IME/MIME Workshop*"; FOCUS (newsletter of the Mathematical Association of America), Volume **28** Issue 8 (November 2008), pages 26–27.

7.3- Karaali, G., Yoshiwara, B.; "*A Different Pencil Too Good to be Ignored? A First Look at Wolfram|Alpha*"; FOCUS (newsletter of the Mathematical Association of America), Volume **29** Issue 5 (October/November 2009), page 15.

7.4- Huber, M., Karaali, G.; "*Welcome to the Journal of Humanistic Mathematics*", editorial; Journal of Humanistic Mathematics, Volume **1** Issue 1 (January 2011), page 1. Available online at `http://scholarship.claremont.edu/jhm/vol1/iss1/2/`

7.5- Karaali, G.; *Journal of Humanistic Mathematics*, in *Media Highlights*, College Mathematics Journal, Volume **42** Number 3 (May 2011), pages 244–252 (page 247).

7.6- Karaali, G.; *Have You Seen This...? Journal of Humanistic Mathematics*, MSOR Connections, Summer 2011, Volume **11** Number 2 (June 2011), page 43.

7.7- Huber, M., Karaali, G.; "*Vampire statistics and other mathematical oddities*", editorial; Journal of Humanistic Mathematics, Volume **1** Issue 2 (July 2011), page 1. Available online at `http://scholarship.claremont.edu/jhm/vol1/iss1/2/`

7.8- Huber, M., Karaali, G.; *Mathematical creation*, editorial; Journal of Humanistic Mathematics, Volume **2** Issue 1 (January 2012), page 1. Available online at `http://scholarship.claremont.edu/jhm/vol2/iss1/2/`

7.9- Karaali, G.; "In Defense of Frivolous Questions", *Inside Higher Education*, Views, April 10, 2012. Available online at `http://www.insidehighered.com/views/2012/04/10/essay-defense-courses-ask-seemingly-frivolous-questions`

Synopsis: Along with article **7.13**, this is an overview of my first first-year writing seminar, *Can Zombies Do Math?*, and my goals in designing it. In particular, I emphasize, among other things, the value of seemingly frivolous questions about zombies and math, the human nature of mathematics, and the centrality of our humanity to the mathematical enterprise. Also see article **7.22**, where I explore some of these questions more formally and in detail.

7.10- Karaali, G.; "Humanistic Mathematics: An Oxymoron?", *Diversity & Democracy*, a publication of the Association of American Colleges and Universities, Volume **15** Number 2 (Spring 2012), page 21.

Synopsis: This article is an exploration of what humanistic mathematics might mean; I was invited to write it by the editor of *Diversity & Democracy*, who had heard me speak about the idea at an AAC&U meeting. There are resonances with this article in articles **3.17**, and **7.5**-**7.6** as they relate to the *Journal of Humanistic Mathematics*, and in articles **7.9** and **7.13** as they relate to my first-year course on zombies and math.

7.11- Huber, M., Karaali, G.; *Games Mathematicians Play*, editorial; Journal of Humanistic Mathematics, Volume **2** Issue 2 (July 2012), page 1. Available online at `http://scholarship.claremont.edu/jhm/vol2/iss2/2/`

7.12- Karaali, G.; "A Tale of Two Workshops: Two Workshops, Three Papers, New Ideas", *AIMatters* (Newsletter of the American Institute of Mathematics), Autumn 2012, page 11.

Synopsis: This article chronicles the development of a new thread in my research agenda, inspired by my participation in two AIM workshops. The work continues to this day, and so far has resulted in articles **3.10**, **3.11**, **3.16**, **3.20**, **3.21**, and to an extent, **3.32**.

7.13- Karaali, G.; "Can Zombies Do Math? In Defense of Frivolous Questions", *Pomona College Magazine*, Fall 2012 (Volume **49** Number 1), pages 28–29.

7.14- Alayont, F., Karaali, G., Pehlivan, L.; "What Does It Take to Teach Nonmajors Effectively?", *FOCUS* (newsletter of the Mathematical Association of America), Volume **32** Number 6 (December 2012/January 2013), pages 11–12.

7.15- Huber, M., Karaali, G.; *Math: That Thing You Do*, editorial; Journal of Humanistic Mathematics, Volume **3** Issue 1 (January 2013), pages 1–2. Available online at `http://scholarship.claremont.edu/jhm/vol3/iss1/2/`

7.16- Huber, M., Karaali, G.; *Mathematics Rocks!*, editorial; Journal of Humanistic Mathematics, Volume **3** Issue 2 (July 2013), page 1. Available online at `http://scholarship.claremont.edu/jhm/vol3/iss2/2/`

7.17- Huber, M., Karaali, G.; *Turn! Turn! Turn!*, editorial; Journal of Humanistic Mathematics, Volume **4** Issue 1 (January 2014), page 1. Available online at `http://scholarship.claremont.edu/jhm/vol4/iss1/2/`

7.18- Karaali, G.; "Nesin Math Village: Mathematics as a Revolutionary Act", *The Mathematical Intelligencer*, Volume **36** Issue 2 (June 2014), pages 45–49.

Synopsis: In this article I describe Nesin Math Village, a unique mathematics institute nestled in the mountains of the Turkish Aegean, founded and led by the indomitable Ali Nesin.

In 2018 Nesin was awarded the Leelavati Prize by the International Mathematical Union for "outstanding contributions for increasing public awareness of mathematics as an intellectual discipline and the crucial role it plays in diverse human endeavors", and this article was quoted in the prize citation.

7.19- Huber, M., Karaali, G.; *Mathematical Perspectives*, editorial; Journal of Humanistic Mathematics, Volume **4** Issue 2 (July 2014), pages 1–2. Available online at `http://scholarship.claremont.edu/jhm/vol4/iss2/2/`

7.20- Karaali, G.; "Inspiring Our Daughters: GoldieBlox, Princesses, and Engineers", Association for Women in Mathematics Newsletter, Volume **44** Number 6 (November-December 2014), pages 10–13.

Synopsis: This is a wide-ranging review of the GoldieBlox toys designed to encourage girls interested in the STEM disciplines. Using my own educational path (through an undergraduate degree in engineering) and my young daughter's experiences with the toys, I aim to tease out just who the appropriate target of the products could be.

7.21- Huber, M., Karaali, G.; *A Mathematician's Choice*, editorial; Journal of Humanistic Mathematics, Volume **5** Issue 1 (January 2015), pages 1–2. Available online at `http://scholarship.claremont.edu/jhm/vol5/iss1/2/`

7.22- Karaali, G.; "Can Zombies Do Math?", in *Mind in Mathematics: Essays on Mathematical Cognition and Mathematical Method*, edited by Mariana Bockarova, Marcel Danesi, Dragana Martinovic and Rafael Núñez, 2015; pages 140–153.

Synopsis: Written for a collected volume of articles on mathematical cognition, this paper explores in detail just what makes mathematics human. The five dimensions I propose to investigate this topic (cognition, consciousness, creativity, community, communication) were first introduced in article **3.19**. The paper also includes an overview of my first-year seminar *Can Zombies Do Math?* and thus complements articles **7.9** and **7.13**.

7.23- Huber, M., Karaali, G.; *Inspiring Mathematical Experiences*, editorial; Journal of Humanistic Mathematics, Volume **5** Issue 2 (July 2015), pages 1–2. Available online at `http://scholarship.claremont.edu/jhm/vol5/iss2/2/`

7.24- Karaali, G.; "On Genius, Prizes, and the Mathematical Celebrity Culture", *The Mathematical Intelligencer*, Volume **37** Issue 3 (September 2015), pages 61–65.

Synopsis: This article explores issues about the mathematical genius meme, about just who gets to win awards, and who gets to call themselves mathematicians. I critique the cultish, celebrity-worship inclinations of present-day mathematicians, and argue for the need to open up our community to become "bigger on the inside". Some of the ideas touched upon here were first introduced in article **3.18**.

7.25- Karaali, G.; "What if ... math were not required in K-12 education?"; *Pomona College Magazine*, Fall 2015 (Volume **52** Number 1), pages 2–3.

Synopsis: In this tongue-in-cheek article, I argue for the abolishment of compulsory mathematics education. Using the parables first proposed by Paul Lockhart in his *A Mathematician's Lament*, I compare the current mathematics education system to a hypothetical system

where art students are not allowed to touch paint before they can recite the names of distinct colors and the birth dates of famous artists, or to another where music students are not allowed to hear a musical tune before they memorize the names of individual notes and their symbols. My goal is to promote a healthier, friendlier, and altogether more humane mathematics education. Also see article **7.29**.

7.26- Huber, M., Karaali, G.; *Not just in the eye of the beholder*, editorial; Journal of Humanistic Mathematics, Volume **6** Issue 1 (January 2016), pages 1–2. Available online at `http://scholarship.claremont.edu/jhm/vol6/iss1/2/`

7.27- Huber, M., Karaali, G.; "WANTED: Journalists of Humanistic Mathematics", *Journal of Humanistic Mathematics*, Volume **6** Issue 1 (January 2016), page 307. Available online at `http://scholarship.claremont.edu/jhm/vol6/iss1/27/`

7.28- Karaali, G., Radunskaya, A.; "Collaboration and Creativity in Southern California: An Offering", Association for Women in Mathematics Newsletter, Volume **46** Number 2 (March-April 2016), pages 30–32.

Synopsis: This article describes a mathematical poetry activity Radunskaya and I organized as part of a mathematics conference for women. Complementing my point in article **3.19** that mathematical poetry can promote a more humanistic understanding of mathematics, this article surmises that mathematical poetry can also help mathematicians themselves connect with each other and their discipline in new ways.

7.29- Karaali, G.; "Math Education: A Messy Problem", *Inside Higher Education*, Views, May 3, 2016. Available online at `https://www.insidehighered.com/views/2016/05/02/math-education-deserves-support-and-attention-essay`. Re-printed in the *Vermont Council of Teachers of Mathematics* Newsletter, May 2016, at `http://mathinvermont.blogspot.com/2016_05_01_archive.html`.

Synopsis: This is an article I wrote in response to Andrew Hacker's well promoted view that algebra is not necessary. As someone who previously argued (in article **7.25**, though mainly tongue-in-cheek) that math education should perhaps not be compulsory, I readily admitted that the current state of math education in the United States is certainly not ideal, but I also argued that mathematicians, researchers, policy makers and others are working on it and making progress. Above all, I believe this is definitely a problem worth working on. Written for a general audience interested in higher education issues, this article has led to many further conversations, both online and off.

7.30- Huber, M., Karaali, G.; *Connections*, editorial; Journal of Humanistic Mathematics, Volume **6** Issue 2 (July 2016), pages 1–2. Available online at `http://scholarship.claremont.edu/jhm/vol6/iss2/2/`

7.31- Huber, M., Karaali, G.; *Mathematical Identities*, editorial; Journal of Humanistic Mathematics, Volume **7** Issue 1 (January 2017), pages 1–2. Available online at `http://scholarship.claremont.edu/jhm/vol7/iss1/2/`

7.32- Huber, M., Karaali, G.; *Words, Words, Words*, editorial; Journal of Humanistic Mathematics, Volume **7** Issue 2 (July 2017), pages 1–3. Available online at `http://scholarship.claremont.edu/jhm/vol7/iss2/2/`

7.33- Huber, M., Karaali, G.; "Math in Seventeen Syllables: An Open Call for Mathematical Haiku", *Journal of Humanistic Mathematics*, Volume **7** Issue 2 (July 2017), pages 435–436. Available online at `http://scholarship.claremont.edu/jhm/vol7/iss2/31/`

7.34- Huber, M., Karaali, G.; *Communicating Mathematics Across Time*, editorial; Journal of Humanistic Mathematics, Volume **8** Issue 1 (January 2018), pages 1–2. Available online at `http://scholarship.claremont.edu/jhm/vol8/iss1/2/`

7.35- Huber, M., Karaali, G.; *How to Wear More than One Hat Well*, editorial; Journal of Humanistic Mathematics, Volume **8** Issue 2 (July 2018), page 1. Available online at `http://scholarship.claremont.edu/jhm/vol8/iss2/2/`

7.36- Karaali, G.; "Mektuplarla Ada Lovelace: Charles Babbage ve Augustus De Morgan Mektupları" ("Ada Lovelace Through Letters: Correspondences with Charles Babbage and Augustus De Morgan" (in Turkish)), submitted.

Synopsis: I have been working on Ada Lovelace and her mathematics this past year, and this article is a general introduction to her story for a Turkish audience. In particular in this paper I retell the basic life story of Ada, and contextualize her mathematical contributions, given our contemporary understanding of what was known at the time. Also see book reviews **4.11-4.12**.

7.37- Karaali, G.; "Mathematics and Poetry", encyclopedia entry for the *Handbook of the Mathematics of the Arts and Sciences*, edited by Bharath Sriraman (Springer 2021), in preparation.

7.38- Karaali, G.; "Japanese Temple Geometry", encyclopedia entry for the *Handbook of the Mathematics of the Arts and Sciences*, edited by Bharath Sriraman (Springer 2021), in preparation.