

# Alexandra Salem

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## Education

2018–2021 **MS in Computer Science & Engineering**, Oregon Health & Science University, Portland, OR, GPA: 3.98 (Graduated 3/19/2021).

### Masters Final Project

Fine-tuned the machine learning based language model BERT for automatic semantic similarity classification of responses to items in the picture-naming evaluation of aphasia known as the Philadelphia Naming Test (PNT). This work was done concurrently for my Masters and research staff duties.

### Relevant Coursework

Natural Language Processing, Machine Learning, Advanced Machine Learning, Deep Learning, Deep Learning II, Introduction to Database Management, Research Ethics for Computer Science & Electrical Engineering, Data Science Programming, Data Visualization, Probability & Statistics

2012–2016 **BA in Mathematics**, Reed College, Portland, OR, GPA: 3.14.

### Undergraduate Thesis

Topic Explanation and Simulation of the HHL Algorithm

Field Quantum Computation

### Relevant Coursework

Introduction to Computing, Data Structures and Algorithms, Single and Multivariable Calculus, General Physics I & II, Probability Theory, Real Analysis, Abstract and Linear Algebra, Combinatorics

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## Work Experience

Nov 2016– Present **Research Staff, Department of Psychiatry/Department of Medical Informatics and Clinical Epidemiology**, Oregon Health & Science University, Portland, OR.

*Research Data Analyst II, Nov 2021– Present.*

- Develop software in Python for research using machine learning and Natural Language Processing to automate assessment of the language of adults with aphasia and children with autism.
- Manage and maintain research data, and analyze, visualize and summarize data findings using Python & R statistical software.
- Write manuscripts for journals and conferences, and present research at conferences to mixed audiences from clinical and computational fields.
- Conduct administrative duties such as coordinating team meetings and monitoring IRB compliance.

*Senior Research Assistant, July 2021– Nov 2021.*

*Research Assistant II, Sept 2017– July 2021.*

*Research Volunteer, Nov 2016– Sept 2017.*

May 2022– July 2022 **Machine Learning Scientist Intern**, Cambia Health Solutions, Portland, OR.

- Retrained, evaluated, and deployed a machine learning classifier for filtering medical claims data. This model reduced member abrasion and claims workload.
- Presented the model to technical and non-technical audiences.

Feb 2017– Sept 2017 **Academic Specialist**, *North Avenue Education*, Portland, OR.

- Provided one-on-one tutoring sessions to students in Algebra, Geometry, Algebra 2, Probability & Statistics, and AP Calculus.
- Planned individualized lessons for as many as ten students at a time.

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## Additional Experience

Fall 2014 **Budapest Semesters in Mathematics (BSM)**, Budapest, Hungary.

- Highly acclaimed study abroad program for Americans and Canadians.
- Classes taught by Hungarian mathematicians in the Hungarian tradition.

Summer 2014 **Summer Mathematics Program for Women (SMP)**, *Carleton College*, Northfield, MN.

- NSF-funded program to encourage and support women in their study of mathematics.
- Studied Introduction to Lie Theory, Low Dimensional Topology.

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## Skills

Python (experience with SciKit-Learn, PyTorch, TensorFlow, Pandas, Numpy, PySpark etc), R (ggplot, tidyverse), SQL, Git, HTML, CSS, JavaScript,  $\text{\LaTeX}$ , MS Office, Audacity, ELAN, Mathematica

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## Publications

MacFarlane, H., Salem, A. C., Bedrick, S., Dolata, J. K., Wiedrick, J., Lawley, G. O., Finestack, L. H., Kover, S. T., Thurman, A. J., Abbeduto, L., & Fombonne, E. (2023). Consistency and reliability of automated language measures across expressive language samples in autism. *Autism Research*. <https://doi.org/10.1002/aur.2897>

Casilio, M., Fergadiotis, G., Salem, A. C., Gale, R., McKinney-Bock, K., & Bedrick, S. (2023). ParAlg: A paraphasia algorithm for multinomial classification of picture naming errors. *Journal of Speech, Language, and Hearing Research*. [https://doi.org/10.1044/2022\\_JSLHR-22-00255](https://doi.org/10.1044/2022_JSLHR-22-00255)

Salem, A. C., Gale, R., Casilio, M., Fleegle, M., Fergadiotis, G., & Bedrick, S. (2022). Refining semantic similarity of paraphasias using a contextual language model. *Journal of Speech, Language, and Hearing Research*. [https://doi.org/10.1044/2022\\_JSLHR-22-00277](https://doi.org/10.1044/2022_JSLHR-22-00277)

MacFarlane, H., Salem, A. C., Chen, L., Asgari, M., & Fombonne, E. (2022). Combining voice and language features improves automated autism detection. *Autism Research*, 15(7), 1288–1300. <https://doi.org/10.1002/aur.2733>

Salem, A. C., MacFarlane, H., Adams, J. R., Lawley, G. O., Dolata, J. K., Bedrick, S., & Fombonne, E. (2021). Evaluating atypical language in autism using automated language measures. *Scientific Reports*, 11(1), 10968. <https://doi.org/10.1038/s41598-021-90304-5>

Adams, J. R., Salem, A. C., MacFarlane, H., Ingham, R., Bedrick, S. D., Dolata, J. K., Hill, A. P., Fombonne, E., & van Santen, J. (2021). A pseudo-value approach to measuring lexico-semantic similarity in the language of children with or without autism. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2021.668344>

Fombonne, E., MacFarlane, H., & Salem, A. C. (2021). Epidemiological surveys of ASD: Advances and remaining challenges. *Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s10803-021-05005-9>

MacFarlane, H., Salem, A. C., Lawley, G. O., Hill, A. P., Zuckerman, K., & Fombonne, E. (2022). Epidemiology of ASD. In *Textbook for Autism Spectrum Disorders* (2nd ed.). American Psychiatric Association Publishing.

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## Presentations/Talks

Salem, A. C., Gale, R., Fergadiotis, G., & Bedrick, S. (2021, October). *Improving Automatic Semantic Similarity Classification of the PNT*. Poster presented by Alexandra Salem at: Academy of Aphasia 59th Annual Meeting, Online.

Salem, A. C., Gale, R., & Bedrick, S. (2021, May). *Fine-tuning BERT for the semantic classifier of the PNT*. Short talk by Alexandra Salem at: Oregon Health & Science University Research Week, Portland, OR.

Salem, A. C., Gale, R., & Bedrick, S. (2021, March). *Fine-tuning BERT for the semantic classifier of the PNT*. Talk by Alexandra Salem at: Masters Final Project Department Talk, Oregon Health & Science University, Portland, OR.

Salem, A. C. (2018, August). *A sentimental analysis of Tolstoy*. Invited talk at: Portland R User Group Meeting, Portland, OR.

Adams, J. R., Salem, A. C., Hill, A. P., Bedrick, S., & van Santen, J. (2018, May). *Semantic similarity of conversational speech between children with and without ASD*. Poster presented by Joel Adams and Alexandra Salem at: Oregon Health & Science University Research Week, Portland, OR.

Adams, J. R., Salem, A. C., Hill, A. P., Bedrick, S., & van Santen, J. (2018, April 27). *Semantic similarity of conversational speech between children with and without ASD*. Short Talk by Joel Adams at: 5th Pacific Northwest Regional NLP Workshop: NW-NLP, 2018, Redmond, WA.

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