Gopala K. Anumanchipalli, PhD

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DISCIPLINARY FIELDS

Speech Neuroscience
Artificial Intelligence
Spoken Language Processing
Neural Engineering & Brain-Computer Interfaces
Assistive technologies

PROFESSIONAL POSITIONS

University of California, Berkeley **2021 - Present**
Assistant Professor
Electrical Engineering & Computer Sciences

University of California, San Francisco **2021 - Present**
Assistant Adjunct Professor, Dept. of Neurological Surgery
Weill Institute for Neurosciences

Computational Precision Health **2021 - Present**
Core Faculty
UC Berkeley & UCSF

University of California, San Francisco , USA **2017 - 2020**
Researcher, Dept. of Neurological Surgery

EDUCATIONAL BACKGROUND

University of California, San Francisco , USA **2013 - 2017**
Postdoctoral Scholar, Dept. of Neurological Surgery

Carnegie Mellon University, USA **2008 - 2013**
PhD in Language and Information Technologies, School of Computer Science

Instituto Superior Técnico, Portugal
PhD in Electrical and Computer Engineering

IIIT-Hyderabad, India **2002 - 2008**
Masters in Computer Science, July 2008
B.Tech in Computer Science (with honors in *Artificial Intelligence*), July 2006

PUBLICATIONS

31. *Under Review*
"A closed-loop neuroprosthesis for speech synthesis in persons with severe paralysis"

30. *Under Review*
"Dissecting neural computations of the human auditory pathway using deep neural networks for speech"

29. *Under Review*
"Generalizable spelling using a speech neuroprosthesis in a paralyzed person",
NAACL 2022

28. *Under Review*
"A Deep Paradigm for Articulatory Speech Representation Learning via Neural Convolutive Sparse Matrix Factorization",

27. *Under Review*
"Deep Speech Synthesis from Articulatory Features"
Interspeech 2022

26. Moses, D. A.*, Liu, J.*, Metzger, S.*, **Anumanchipalli, G. K.** et al.,
"Neuroprosthesis for Decoding Speech in a Paralyzed Person with Anarthria",
New England Journal of Medicine, 2021. **BCI Award 2021**

25. Chang, E. F. & **Anumanchipalli, G. K.**,
"Toward a Speech Neuroprosthesis",
Journal of the American Medical Association, 2020.

24. Sun, P.*, **Anumanchipalli, G. K.*** & Chang, E. F.,
"Brain2Char: A Deep Architecture for Decoding Text from Brain Recordings",
Journal of Neural Engineering, 2020.

23. **Anumanchipalli, G. K.***, Chartier, J.*, Chang, E. F.,
"Speech Synthesis From Neural Decoding of Spoken Sentences",
Nature, 2019.

22. Chartier, J.*, **Anumanchipalli, G. K.***, Johnson, K. & Chang, E. F.,
"Encoding of Articulatory Kinematic Trajectories in the Human Speech Sensorimotor Cortex",
Neuron, 2018.

21. Baud, M., Kleen, J, **Anumanchipalli, G. K.**, Hamilton, L., Knowlton, R., Leng, T., Chang, E. F.,
"Unsupervised learning of spatiotemporal interictal discharges in focal epilepsy",
Journal of Neurosurgery, 2017.

20. Bouchard, K. E., Conant, D. F., **Anumanchipalli, G. K.**, Dichter, B., Chaisanguanthum, K. S., Johnson, K. A., and Chang, E. F.,
"High-Resolution, Non-Invasive Imaging of Upper Vocal Tract Articulators Compatible with Human Brain Recordings",
PloS one 11.3, March 2016.

19. Livezey, J.*, **Anumanchipalli, G. K.***, Cheung, B., Prabhat, Sommer, F. T., DeWeese, M. R., Bouchard, K. E., and Chang, E. F.,
" Classifying spoken syllables from human sensorimotor cortex with deep networks" ,
NIPS 2015 workshop on *Statistical Methods for Understanding Neural Systems*, 2015

18. **Anumanchipalli, G. K.**, Oliveira, L. C., Black, A. W,
"Data-driven Intonational Phonology",
Acoustical Society of America , 2013

17. Sitaram, S., **Anumanchipalli, G. K.**, Chiu, J., Parlikar, A. U., and Black, A., W,
"Text to Speech in New Languages without a Standardized Orthography " ,
ISCA SSW8, 2013.

16. Hovy, D., **Anumanchipalli, G. K.**, Parlikar, A., Vaughn, C., Lammert, A., Hovy, E. & Black, A. W,
"Analysis and Modeling of "Focus" in Context",
ISCA Interspeech 2013.

15. **Anumanchipalli, G. K.**, Oliveira, L. C. & Black, A. W,
"Accent Group Modeling for Improved Prosody in Statistical Parameteric Speech Synthesis",
IEEE ICASSP 2013.

14. **Anumanchipalli, G. K.**, Oliveira, L. C. & Black, A. W,
"A Style-Capturing Approach for F0 Transformation in Voice Conversion",
IEEE ICASSP 2013. **Best Student Paper Award**

13. **Anumanchipalli, G. K.**, Oliveira, L. C. & Black, A. W,
"Intent Transfer in Speech-to-Speech Machine Translation",
IEEE SLT 2012.

12. **Anumanchipalli, G. K.**, Meinedo, H., Bugalho, M., Trancoso, I., Oliveira, L. C. & Black, A. W.,
Text Dependent Pathological Voice Detection,
in Proceedings of Interspeech 2012, Portland, September 2012.

11. **Anumanchipalli, G. K.**, Oliveira, L. C. & Black, A. W,
"A Statistical Phrase/Accent Model for Intonation Modeling",
Interspeech 2011.

10. **Anumanchipalli, G. K.**, Prahallad, K. & Black, A. W,
" Festvox: Tools for Creation and Analyses of Large Speech Corpora",
Workshop on Very Large Scale Phonetics Research, 2011.

9. **Anumanchipalli, G. K.**, Cheng, Y-C., Fernandez, J., Huang, X., Mao, Q. & Black, A. W,
" KlaTTStat: Knowledge-based Statistical Parametric Speech Synthesis",
ISCA Speech Synthesis Workshop, 2010.

8. **Anumanchipalli, G. K.**, Muthukumar, P., Nallasamy, U., Parlikar, A., Black, A. W. & Langner, B.,
" Improving Speech Synthesis for Noisy Environments" ,
ISCA Speech Synthesis Workshop, Japan, September 2010

7. **Anumanchipalli, G. K.** & Black, A. W
" Adaptation Techniques for Speech Synthesis in Under-resourced languages" ,
Spoken Language Technologies for Under-resourced Languages (SLTU), 2010

6. Das, A., Chittaranjan, G. & **Anumanchipalli, G. K.**
" Usefulness of Text-Conditioning and a New Database for Text-Dependant Speaker Recognition Research" ,
in Proceedings of the Interspeech 2008, Australia, September 2008

5. **Anumanchipalli, G. K.**, Prahallad, K & Black, A. W
" Significance of Early Tagged Contextual Graphemes in Grapheme Based Speech Synthesis and Recognition Systems" ,
Proceedings of the IEEE ICASSP 2008

4. Bohus, D., Puerto, S. G., Huggins-Daines, D., Keri, V., **Anumanchipalli, G.K.**, Kumar, R., Raux, A., and Tomko, S.,
"ConQuest: An Open-Source Dialog System for Conferences" ,
in Proceedings of the ACL HLT-NAACL 2007.

3. **Anumanchipalli, G. K.** , Mosur, R., and Reddy, R
"Improving Pronunciation Inference using n-best list, Acoustics and Orthography" ,
IEEE ICASSP 2007

2. **Anumanchipalli, G. K.**, Chitturi, R., Joshi, S., Kumar, R., Singh, S., Sitaram, R., and Kishore, S. P.,
"Development of Indian Language Speech Databases for LVCSR" ,
International Conference on Speech and Computer (SPECOM), 2005

1. Chitturi, R., Keri, V., **Anumanchipalli, G. K.**, Joshi, S.,
"Lexical Modeling for Non-Native speech recognition using Neural Networks" ,
in Proceedings of the International Conference on Natural Language Processing (ICON), 2005.

PEER REVIEWED POSTER ABSTRACTS

4. **Anumanchipalli, G. K.***, Chartier, J.*, Chang E. F.,
"Synthesizing speech from the human sensorimotor cortex",
Cosyne 2018, *SFN* 2018

3. Chartier, J.*, **Anumanchipalli, G. K.***, Chang, E. F.,
"Articulatory gesture encoding in human sensorimotor cortex during continuous speech production",
Cosyne 2017, *SNL* 2017, *SFN* 2017

2. Livezey, J.*, **Anumanchipalli, G. K.***, Cheung, B., Prabhat, DeWesse, M, Chang, E. F.
"Deep networks reveal the structure of motor control in sensorimotor cortex during speech production",
Cosyne 2016

1. **Anumanchipalli, G. K.**, Oliveira, L. C., Black, A. W,
"Data-driven Intonational Phonology",
Acoustical Society of America , 2013

PATENTS

- [Pending] "Methods of generating speech using articulatory physiology and systems for practicing the same", US Patent.

MENTORING

- **Doctoral**: (BioE) : Josh Chartier (PhD 2019), Jessie Liu, Sean Metzger,
(EECS): Kaylo Littlejohn, Jiachen Lian, Cheol Jun Cho, Peter Wu.

- **Post-doctoral**: Pengfei Sun, PhD (UCSF Neurosurgery), Yuanning Li (Weill Neurosciences), Ran Wang (UCSF)

TEACHING

- EE123: Digital Signal Processing, Spring 2022, UC Berkeley

- EE225D: Audio Signal Processing in Humans and Machines, Fall 2021, UC Berkeley

- Teaching Assistant for "Introduction to Speech Systems" (IIIT Hyderabad, 2005); "Introduction to Speech Processing" (CMU, 2010); "Statistical Learning" (IST Portugal, 2012)

- Instructor for "Introduction to Linear Algebra", Lisbon Machine Learning Summer school, LxMLS 2012

SERVICE & PROFESSIONAL ACTIVITIES

- **Journal reviewer**: Special topics in Signal Processing [IEEE], Transactions on Audio, Speech and Language Processing [IEEE/ACM], International Journal for Speech Technology [Springer], Speech Communication [Elsevier] ; Computer, Speech and Language; NeuroImage [Elsevier]; Journal of Neural Engineering [IoP]

- **Program Committee/ Conference Reviewer**: Interspeech 2013–2022, ICASSP 2016–2022, LREC 2014–2020

- **Organizing Committee** : IWSLT 2012, SSW 2016, SECNS 2016

- **Session Co-chair**: BCI 2021

- **Selection Committees:** BCI Society Early Career Award 2021, NSF CISE adhoc reviewer (2021), Graduate Admissions at EECS, UC Berkeley, 2021.

CURRENT EXTERNAL RESEARCH SUPPORT

- PI for NSF Award "Collaborative Research: RI: Medium: Flexible Deep Speech Synthesis through Gestural Modeling", $400000 (Co-PIs Alan Black, CMU and Louis Goldstein, USC)

- Rose Hills Innovator 2021, "Multimodal Intelligent Interfaces for Assistive Communication" $170000

- Google Research Award "Neural architectures for streaming speech synthesis from biosignals", $60000

INVITED TALKS

- "A Statistical Phrase/Accent Model and Its Applications in Speech Processing", IIIT Hyderabad, 2013
- "A Statistical Approach to Intonation Modelling", ICSI Berkeley, 2014
- "Synthesizing Speech directly from the Human Brain", Phorum, Dept. of Linguistics, UC Berkeley, 2018
- "An Articulatory Kinematic Account of the Speech Motor Cortex", Cosyne 2018 Workshop on Recent advances in Neuroengineering, Breckenridge, 2018
- "Intelligible Speech Synthesis from Neural Decoding of Spoken Sentences", Center for Neural Engineering & Prostheses, Annual Retreat, UC Berkeley/UCSF 2018
- "Physiology Grounded Deep Networks for Decoding Speech and Language from the Brain", AESoP Auditory Engineering Workshop, KU Leuven, 2019
- "Physiology Grounded Deep Networks for Decoding Speech and Language from the Brain", Unbabel Inc., 2019
- "Decoding Speech and Language Representations from the Brain", CLSP Seminar, Johns Hopkins University, 2019
- 2020 Gordon Research Conference on Neuroelectronic Interfaces, Ventura, CA 2020
- Hearing Seminar, Stanford University, 2020
- EECS Seminar, UC Berkeley, 2020
- 64th Annual Meeting of the German Society for Clinical Neurophysiology and Functional Imaging, Baden-Baden, 2020
- "Recent Developments in Brain-Computer Interfaces for Communication", Neural Engineering Seminar, University of Washington, 2021
- "A Human-Centered Agenda for Spoken Language AI", BAIR Keynote, UC Berkeley 2021
- "Challenges and Opportunities in Assistive AI for Spoken Communication", BEARS 2021, UC Berkeley, 2021
- Keynote, BCI Conference, Korea, 2021
- Invited speaker, 2022 32nd Kavli Frontiers of Science Symposium, National Academy of Sciences
- Invited speaker, 2022 Israeli-American Kavli Frontiers of Science Symposium, National Academy of Sciences
- Invited speaker, 2022 Gordon Research Conferences, Boston, Massacheussets

AWARDS & HONOURS

- Doctoral Fellowship from Foundation for Science and Technology, Portugal (2008-2013)
- "Computers that talk with people", profile in the Portuguese tech magazine **Sábado**, Jun 1, 2011.
- IEEE Spoken Language Processing **outstanding student paper** award at IEEE ICASSP 2013, Vancouver, Canada.
- "Brain activity patterns underlying fluent speech revealed", **Science Daily**, Jun 1, 2018.
- Abstract shortlisted for an exclusive *AI-bidirectional* press conference at the SFN 2018 (< 50 selected out of 13884 abstracts; declined)

- "Artificial intelligence turns brain activity into speech", **Science News**, Jan 2, 2019.
- "Scientists Create Speech from Brain Signals", covered in over **200 international news and Tech media** outlets including **New York Times**, **BBC**, **NPR**, **Reuters**, **The Guardian**, **Wall Street Journal**, **National Geographic**, **Washington Post**, **MIT Technology Review**, **Wired**, **Techcrunch**, **Scientific American** etc, Apr 25, 2019.
- "Scientists translate brain signals into speech sounds", **NIH** press release 24th April 2019.
- Radio Interview on **BBC Radio 4** *Inside Science* and **BBC World Service** *Science in Action*, 25th April, 2019.
- Recognized as one of **top 10 Breakthroughs for 2019** by Institute of Physics' **Physics World**.
- Listed among **Biggest medical breakthroughs of 2019**, BBC News.
- Ranked **37** among 1.3 million research outputs ($< 0.007\%$) tracked by Altmetric for the year 2019.
- Plenary speaker at the 64th Annual Meeting of the German Society for Clinical Neurophysiology and Functional Imaging, Baden-Baden, 2020.
- "Tapping Into the Brain to Help a Paralyzed Man Speak", **New York Times**, also covered in >100 national and international news outlets, July 16th 2021.
- Recognized as Rose Hills Innovator 2021.
- Expert contributor to Gizmodo article "Will It Be Possible to Upload Information to My Brain?", Sep 20th, 2021
- Awarded the prestigious BCI Award 2021 (rank 2) for work on decoding communication signals directly from the brain of a paralyzed individual.
- Honored as a Google Research Scholar, 2022.

REFERENCES

Available on request.