Zafar Rafii
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https://github.com/zafarrafii
https://www.linkedin.com/in/zafarrafii/

EMPLOYMENT

2022-now	Research Scientist
	Audible Magic, Los Gatos, CA, USA
2021-2022	Research Engineer Manager
	Gracenote, Emeryville, CA, USA
2018-2021	Senior Research Engineer
	Gracenote, Emeryville, CA, USA
2014-2017	Research Engineer
	Gracenote, Emeryville, CA, USA
2013	PhD Intern (6 months)
	Gracenote, Emeryville, CA, USA
2007-2008	Research Engineer (1+ year)
	Mist Technologies (now Audionamix), Paris, France
2002-2004	Student Internship (3 months)
	Dalkia, Paris, France

EDUCATION

2008-2014	PhD in Electrical Engineering and Computer Science
	Northwestern University, Evanston, IL, USA
	Thesis: Source Separation by Repetition
2008-2011	Certificate in Cognitive Science
	Northwestern University, Evanston, IL, USA
2005-2006	Master of Science in Electrical Engineering
	Illinois Institute of Technology, Chicago, IL, USA
2003-2006	Master of Electrical Engineering, Computer Science and Telecommunications
	Ecole Nationale Supérieure d'Electronique et de ses Applications, Cergy, France
2001-2003	Classes Preparatoires aux Grandes Ecoles, Physics and Engineering Science
	Jacques Decour, Paris, France
1998-2001	Baccalauréat in Sciences
	Louis-le-Grand, Paris, France

TEACHING

2014	Machine Perception of Music and Audio (course evaluation: 5.4/6)
2012	Machine Perception of Music and Audio (course evaluation: 5.0/6)
2010	Introduction to Electrical Engineering (course evaluation: 5.2/6)

FELLOWSHIPS

2014	Terminal Year Fellowship
2012	Advanced Cognitive Science Fellowship
2008	Walter P. Murphy Fellowship

VOLUNTEERING

Organizer

2023-now	Women in Music Information Retrieval (WiMIR) mentoring program
2015-now	Bay Innovative Signal Hackers (BISH) Bash meetup group
2015-2017	Community-based Signal Separation Evaluation Campaign (SiSEC)

Chair

2019-now	IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) session chair
2019-now	IEEE ICASSP reviewer chair

2021-2023   IEEE Audio and Acoustic Signal Processing (AASP) Technical Committee industry subcommittee chair
2021   IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA) industry liaison chair

Associate Editor
2023-now   IEEE Transactions on Audio, Speech and Language Processing (TALSP)
2023-now   EURASIP Journal on Audio, Speech, and Music Processing (JASMP)

Journal Reviewer
2024-now   IEEE Open Journal of Signal Processing
2023-now   Transactions of the International Society for Music Information Retrieval (TISMIR)
2021-now   IEEE Signal Processing Magazine
2017-now   EURASIP JASMP
2015-now   Journal of the Audio Engineering Society (JAES)
2014-now   IEEE Signal Processing Letters
2010-now   IEEE TASLP
2018   EURASIP Journal on Advances in Signal Processing (JASP)
2017   IEEE Access

Conference Reviewer
2015-now   IEEE WASPAA
2014-now   European Signal Processing Conference (EUSIPCO)
2013-now   IEEE ICASSP
2009-now   International Society for Music Information Retrieval (ISMIR)
2018   International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA)
2013-2016   ACM International Multimedia Conference
2013   International Conference on Digital Audio Effects (DAFx)

Other
2020-now   WiMIR mentor
2012-now   IEEE Senior member
2017-2023   IEEE AASP Technical Committee member
2023   IEEE WASPAA meta-reviewer

PUBLICATIONS
Patents
- Zafar Rafii. "Methods and Apparatus for Harmonic Source Enhancement," 18/052,481, March 2023.
- Markus Cremer, Zafar Rafii, Robert Coover, and Prem Seetharaman. "Automated Cover Song Identification," 17/946,915, January 2023.
- Markus Cremer, Robert Coover, Zafar Rafii, Aneesh Vartakavi, Andreas Schmidt, Todd Hodges. "Methods and Apparatus to Control Lighting Effects," 17/780,938, December 2022.
- Zafar Rafii, Markus Cremer, and Bongjun Kim. "Methods and Apparatus to Identify Sources of Network Streaming Services using Windowed Sliding Transforms," 11,430,454, August 2022.
- Alexander Berrian, Todd Hodges, Robert Coover, Matthew Wilkinson, and Zafar Rafii. "Audio Content Recognition Method and System," 17/315,820, June 2022.
- Xiaochen Liu, Joseph Renner, Joshua Morris, Todd Hodges, Robert Coover, and Zafar Rafii. "Cover Song Identification Method and System," 17/335,657, June 2022.
- Zafar Rafii. "Audio Matching based on Harmonogram," 11,366,850, June 2022.
- Zafar Rafii. "Methods and Apparatus to Improve Detection of Audio Signatures," 17/541,020, March 2022.
- Zafar Rafii, Markus Cremer, and Bongjun Kim. "Methods, Apparatus and Articles of Manufacture to Identify Sources of Network Streaming Services," 17/360,605, October 2021.
- Zafar Rafii. "Methods and Apparatus to Extract a Pitch-independent Timbre Attribute from a Media Signal," 17/157,780, May 2021.
- Zafar Rafii and Prem Seetharaman. "Audio Identification based on Data Structure," 16/927,577, October 2020.
- Zafar Rafii. "Methods and Apparatus to Perform Windowed Sliding Transforms," 10,726,852, July 2020.

- Rober Coover and Zafar Rafii. "Methods and Apparatus to Fingerprint an Audio Signal via Normalization," 16/453,654, March 2020.
- Bryan Pardo and Zafar Rafii. "Audio Separation System and Method," 13/612,413, July 2015.

Journal Articles

- Zafar Rafii, Erling Wold, and Richard Boulderstone. "How to Design a Cheap Music Detection System Using a Simple Multilayer Perceptron With Temporal Integration," *IEEE Signal Processing Magazine*, vol. 41, no. 4, October 2024.
- Zafar Rafii. "The Constant-Q Harmonic Coefficients: A Timbre Feature Designed for Music Signals," *IEEE Signal Processing Magazine*, vol. 39, no. 3, May 2022.
- Zafar Rafii. "Sliding Discrete Fourier Transform with Kernel Windowing," *IEEE Signal Processing Magazine*, vol. 35, no. 6, November 2018.
- Zafar Rafii, Antoine Liutkus, Fabian-Robert Stöter, Stylianos Ioannis Mimilakis, Derry FitzGerald, and Bryan Pardo. "An Overview of Lead and Accompaniment Separation in Music," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 26, no. 8, August 2018.
- Zafar Rafii, Zhiyao Duan, and Bryan Pardo. "Combining Rhythm-based and Pitch-based Methods for Background and Melody Separation," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 22, no. 12, December 2014.
- Antoine Liutkus, Derry FitzGerald, Zafar Rafii, Bryan Pardo, and Laurent Daudet. "Kernel Additive Models for Source Separation," *IEEE Transactions on Signal Processing,* vol. 62, no. 16, August 2014.
- Zafar Rafii and Bryan Pardo. "REpeating Pattern Extraction Technique (REPET): A Simple Method for Music/Voice Separation," *IEEE Transactions on Audio, Speech, and Language Processing*, vol. 21, no. 1, January 2013.
- Andrew Todd Sabin, Zafar Rafii, and Bryan Pardo. "Weighting-Function-Based Rapid Mapping of Descriptors to Audio Processing Parameters," *Journal of the Audio Engineering Society*, vol. 59, no. 6, June 2011.

Conference Proceedings

- Aneesh Vartakavi, Amanmeet Garg, and Zafar Rafii. "Audio Summarization for Podcasts," *29th European Signal Processing Conference*, Dublin, Ireland, August 23-27, 2021.
- Bongjun Kim and Zafar Rafii. "Lossy Audio Compression Identification," *26th European Signal Processing Conference*, Rome, Italy, September 3-7, 2018.
- Prem Seetharaman and Zafar Rafii. "Cover Song Identification with 2d Fourier Transform Sequences," *42nd IEEE International Conference on Acoustics, Speech and Signal Processing*, New Orleans, USA, March 5-9, 2017.
- Derry FitzGerald, Zafar Rafii, and Antoine Liutkus. "User Assisted Separation of Repeating Patterns in Time and Frequency using Magnitude Projections," *42nd IEEE International Conference on Acoustics, Speech and Signal Processing*, New Orleans, USA, March 5-9, 2017.
- Antoine Liutkus, Fabian-Robert Stöter, Zafar Rafii, Daichi Kitamura, Bertrand Rivet, Nobutaka Ito, Nobutaka Ono, and Lujie Fontecave. "The 2016 Signal Separation Evaluation Campaign," *13th International Conference on Latent Variable Analysis and Signal Separation*, Grenoble, France, February 21-23, 2017.
- Nobutaka Ono, Zafar Rafii, Daichi Kitamura, Nobutaka Ito, and Antoine Liutkus. "The 2015 Signal Separation Evaluation Campaign," *12th International Conference on Latent Variable Analysis and Signal Separation*, Liberec, Czech Republic, August 25-28, 2015.
- Zafar Rafii, Antoine Liutkus, and Bryan Pardo. "A Simple User Interface System for Recovering Patterns Repeating in Time and Frequency in Mixtures of Sounds," *40th IEEE International Conference on Acoustics, Speech and Signal Processing*, Brisbane, Australia, April 19-24, 2015.
- Antoine Liutkus, Derry FitzGerald, and Zafar Rafii. "Scalable Audio Separation with Light Kernel Additive Modelling," *40th IEEE International Conference on Acoustics, Speech and Signal Processing*, Brisbane, Australia, April 19-24, 2015.
- Derry FitzGerald, Antoine Liutkus, Zafar Rafii, Bryan Pardo, and Laurent Daudet. "Harmonic/Percussive Separation using Kernel Additive Modelling," *25th IET Irish Signals and Systems Conference*, Limerick, Ireland, June 26-27, 2014.
- Antoine Liutkus, Zafar Rafii, Bryan Pardo, Derry FitzGerald, and Laurent Daudet. "Kernel Spectrogram Models for Source Separation," *4th Joint Workshop on Hands-free Speech Communication and Microphone Arrays*, Nancy, France, May 12-14, 2014.

- Zafar Rafii, Bob Coover, and Jinyu Han. "An Audio Fingerprinting System for Live Version Identification using Image Processing Techniques," *39th IEEE International Conference on Acoustics, Speech and Signal Processing*, Florence, Italy, May 4-9, 2014.
- Zafar Rafii, François G. Germain, Dennis L. Sun, and Gautham J. Mysore. "Combining Modeling of Singing Voice and Background Music for Automatic Separation of Musical Mixtures," *14th International Society for Music Information Retrieval*, Curutiba, PR, Brazil, November 4-8, 2013.
- Zafar Rafii and Bryan Pardo. "Online REPET-SIM for Real-time Speech Enhancement," *38th IEEE International Conference on Acoustics, Speech and Signal Processing*, Vancouver, BC, Canada, May 26-31, 2013.
- Zafar Rafii and Bryan Pardo. "Music/Voice Separation using the Similarity Matrix," *13th International Society for Music Information Retrieval*, Porto, Portugal, October 8-12, 2012.
- Antoine Liutkus, Zafar Rafii, Roland Badeau, Bryan Pardo, and Gaël Richard. "Adaptive Filtering for Music/Voice Separation Exploiting the Repeating Musical Structure," *37th IEEE International Conference on Acoustics, Speech and Signal Processing*, Kyoto, Japan, March 25-30, 2012.
- Mark Cartwright, Zafar Rafii, Jinyu Han, and Bryan Pardo. "Making Searchable Melodies: Human vs. Machine," *3rd Human Computation Workshop*, San Francisco, CA, USA, August 8, 2011.
- Zafar Rafii and Bryan Pardo. "A Simple Music/Voice Separation Method based on the Extraction of the Repeating Musical Structure," *36th IEEE International Conference on Acoustics, Speech and Signal Processing*, Prague, Czech Republic, May 22-27, 2011.
- Zafar Rafii and Bryan Pardo. "Degenerate Unmixing Estimation Technique using the Constant Q Transform," *36th IEEE International Conference on Acoustics, Speech and Signal Processing*, Prague, Czech Republic, May 22-27, 2011.
- Zafar Rafii and Bryan Pardo. "Learning to control a Reverberator using Subjective Perceptual Descriptors," *10th International Society for Music Information Retrieval*, Kobe, Japan, October 26-30, 2009.

Book Chapters
- Bryan Pardo, Zafar Rafii, and Zhiyao Duan. "Audio Source Separation in a Musical Context," *Handbook of Systematic Musicology*, Springer, Berlin, Heidelberg, 2018.
- Zafar Rafii, Antoine Liutkus, and Bryan Pardo. "REPET for Background/Foreground Separation in Audio," *Blind Source Separation*, Springer, Berlin, Heidelberg, 2014.

Technical Reports
- Zafar Rafii and Bryan Pardo. "A Digital Reverberator Controlled through Measures of the Reverberation," Northwestern University, EECS Department Technical Report NWU-EECS-09-08, 2009.

Data Sets
- Zafar Rafii, Antoine Liutkus, Fabian-Robert Stöter, Stylianos Ioannis Mimilakis, and Rachel Bittner. "MUSDB18-HQ – an uncompressed version of MUSDB18," https://doi.org/10.5281/zenodo.3338373, 2019.
- Zafar Rafii, Antoine Liutkus, Fabian-Robert Stöter, Stylianos Ioannis Mimilakis, and Rachel Bittner. "The MUSDB18 corpus for music separation," https://doi.org/10.5281/zenodo.1117372, 2017.

PRESENTATIONS
Tutorials
- Josh McDermott, Bryan Pardo, and Zafar Rafii. "Leveraging Repetition to Parse the Auditory Scene," *13th International Society for Music Information Retrieval*, Porto, Portugal, October 8-12 2012.

Workshops
- Zafar Rafii. "An Audio Fingerprinting System for Live Version Identification using Image Processing Techniques," *Midwest Music Information Retrieval Gathering*, Northwestern University, Evanston, IL, USA, June 14, 2014.
- Zafar Rafii. "REPET," *Midwest Music Information Retrieval Gathering*, Northwestern University, Evanston, IL, USA, June 24, 2011.
- Zafar Rafii, Raphael Blouet, and Antoine Liutkus. "Discriminant Approach within Non-negative Matrix Factorization for Musical Components Recognition," *DMRN+2: Digital Music Research Network One-day Workshop 2007*, Queen Mary University of London, London, UK, December 18, 2007.

Talks
- Zafar Rafii. "Sliding DFT with Kernel Windowing," Tokyo-BISH Bash, Tokyo, Japan, March 30, 2021.

- Zafar Rafii. "Identifying Video Sources by Identifying Audio Compression," Télécom ParisTech, Paris, France, April 13, 2018.
- Zafar Rafii. "Source Separation by Repetition," Center for Computer Research in Music and Acoustics, Stanford University, Stanford, CA, USA, July 15, 2015.
- Zafar Rafii. "Source Separation by Repetition," Center for New Music and Audio Technologies, University of California at Berkeley, Berkeley, CA, USA, May 11, 2015.
- Zafar Rafii. "A Simple Music/Voice Separation Method based on the Extraction of the Underlying Repeating Structure," Télécom ParisTech, Paris, France, July 29, 2011.

Lectures
- Zafar Rafii. "Audio Fingerprinting," EECS 352: Machine Perception of Music and Audio, Northwestern University, 2014.
- Zafar Rafii. "REpeating Pattern Extraction Technique (REPET)," EECS 352: Machine Perception of Music and Audio, Northwestern University, 2014.
- Zafar Rafii. "Rhythm Analysis in Music," EECS 352: Machine Perception of Music and Audio, Northwestern University, 2014.
- Zafar Rafii. "Time-frequency Masking," EECS 352: Machine Perception of Music and Audio, Northwestern University, 2014.

PERSONAL
Languages
- English (fluent), French (native), German (beginner), Persian (beginner), Italian (beginner), Vietnamese (beginner).

Hobbies
- Biking, brewing, cooking, eating, learning, reading, running, traveling.

Travel
- Andorra, Australia, Austria, Belgium, Canada, China, Czech Republic, France, Germany, Greece, Hungary, Indonesia, Italy, Iran, Japan, Malta, Netherlands, Portugal, South Korea, Spain, United Kingdom, United States, Vietnam.