Rébecca Kleinberger, Ph.D.

PERSONAL INFORMATION	**Assistant Professor of Humanics and AI**	**Northeastern University**

Assistant Professor of Humanics and AI
Music Department & Khoury College of Computer Science
MIT Media Lab & McGovern Institute affiliate
Ryder 363, 11 Leon St, Boston, MA, 02115

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EDUCATION

2020   **Ph.D. in Media Arts and Sciences, MIT Media Lab** (Cambridge, US)
Thesis: Vocal Connection: Rethinking the Voice as a Medium for Personal, Interpersonal, and Interspecies Understanding
MIT Media Lab, Pr. Tod Machover (readers: Pr. S. Ghosh & Dr. J.M. Baker)

2014   **MS in Media Arts and Sciences, MIT Media Lab** (Cambridge, US)
Thesis: Singing about Singing: Using the Voice as a Tool for Self-Reflection
MIT Media Lab, Pr. Tod Machover, (readers: Pr. R. Picard & Pr. R. Patel)

2012   **MRes in VR and Computer Graphics, UCL** (London, UK)
University College London, Pr. Antony Steed

2011   **MEng, ENSAM** (Paris, France)
Ecole Nationale Superieure des Arts et Métiers ParisTech Graduate School

2010   **BS in Mathematics and Engineering** (Paris, France)
Ecole Nationale Superieure des Arts et Métiers ParisTech

EMPLOYMENT

2022 - present   **Assistant Professor of Humanics and AI** Northeastern University
College of Arts, Media and Design | Khoury College of Computer Sciences
Voice Technology | Inner Voice Research | Animal-Computer Interaction

Affiliate Researcher MIT Media Lab & McGovern Institute of Technology at MIT

2021 - 2022   Research Scientist (MIT) & Disruptive Research Strategist (HARMAN Int.)
- Pursue research projects and lead collaborations on Voice Technology
- Advise HARMAN Int. on research, fund & lead engagements, budget: $500k/year

2020 - 2021   Postdoc Researcher, **MIT McGovern Institute for Brain Research** (Cambridge)
- Developed vocal neuro AR system for therapeutic & mental health applications
- Invented novel technology to reduce stuttering: 50-100% fluency increase
- Deployed iOS app for intervention and longitudinal validation

2012 - 2020   Ph.D. Research Assistant, **MIT Media Lab, Opera of the Future** (Cambridge, USA)
- Ph.D. researcher with unique expertise on the voice as a means for expression, interaction, health assessment & assistive tech. Mixes CS, Immersive Media, XR, ML, HCI, Neurology, Cognitive Sciences, Biology, Linguistics to create innovative voice experiences.
- Ran all stages of research: concept, development, validation, publication
- Led teams of 10+ collaborators, interactions with funding institutions
→ **Mumble Melody**: music-based technology for people who stutter.
→ **Sonic Enrichment at the San Diego Zoo**: deployed tech interventions for animals
→ **The Memory Music Box**: cognitively sustainable device for late-stage memory loss
→ **The Orb**: hand-held device to map voices to vibrations

2016   Research Intern, Assistive Technology
Microsoft Research, HXB group (Cambridge, UK)
- Conceived & developed audio AR ML system to help the blind with social navigation
- Prototype audio UI for blind users & novel zippotentiometer for intuitive textile UI

2010   Invited Researcher, worked on the LuminAR project directed by Natan Linder
MIT Media Lab, Fluid Interface Group (Cambridge, USA)

TEACHING EXPERIENCE	2022 - present	**Class Design and Teaching** Northeastern University, (Boston, MA, USA)
		• Introduction to Music Technology (CAMD)
		  • New Interfaces for Musical Expression (CAMD)
		  • Animal-Computer Interaction Seminar (Khoury)

	2021	**Guest lecture at Utah University Honors Program**, (Salt Lake City, UT, USA) Voice Research across Fields
	2020	**Co-instructor - Arts at the Media Lab Class**, (Cambridge, MA, USA) Co-designed curriculum, curated students projects, transferred class experience to online
	2012 - 2020	**Teaching Assistant at the MIT Media Lab** project-based classes, 15-20 grad students Principles of Awareness Class - Spring 2017 & Spring 2016 Music Aesthetic and Media Technology Class - Fall 2013 & Fall 2016
	2019	**Guest lecture at Parson School of Design**, (New York, NY, USA) Sonic and Vocal Enrichment at the Zoo
	2018	**Seminar class at the Sorbonne University**, (Paris, France) Voice in Human-Computer Interactions
	2016	**Guest Lecture at Colorado College**, (Colorado Springs, CO, USA) Animal and Music

ADVISING & MENTORING EXPERIENCE	Undergraduates:	Megha Vemuri	Fall 2020 - Fall 2022
		Jasmine Wu	Fall 2020 - Spring 2021
		Shreya Huilgol (co-mentor)	Spring 2020
		Anne Harrington	Summer 2019 - Fall 2019
		Lydia Yu	Summer 2019 - Fall 2019
		Janelle Sands	Spring 2018 - Fall 2019
		Anushka Ray (co-mentor)	Fall 2018
		Eva Gao (co-mentor)	Summer 2018
		Jack Moore	Fall 2017
		George Stefanakis	Summer 2017 - Fall 2019
		Sarah Sime	Summer 2017
		Lantian Chen	Summer 2017
		Michelle Wu	Spring 2017
		Sebastien Franjou	Fall 2016 - Fall 2017
		Larry Wang (co-mentor)	Spring 2016
		Garrett Parish (co-mentor)	Spring 2016
		Xu Liang	Spring 2015
		Galen Chuang	Fall 2015 - Summer 2016
		Chantine Akiyama	Fall 2014 - Summer 2016
	Others	Megan McMahon (Co-Op)	Spring 2023 - present
		Alisha Prasad (Technical Associate)	Fall 2022 - present
		Darius Petermann (contractor)	Fall 2020 - Spring 2022
		Frances Mulligan (intern)	Spring 2021 - Spring 2022
		Jacob Alappatt (PhD Student)	Spring 2021

Graduate Resident Advisor (GRT) — Advised 100+ undergraduates between 2013-2020 on MIT Campus.
• Organised 50+ events, educational/cultural programming, talk series
• **Safety & Mental Health**: direct to resources, live-in mentor
• **Academic & Personal Growth**: i.e. grad school application coaching
• **Diversity & Inclusion**: promoting citizenship and belonging

TALKS, WORKSHOPS & EXHIBITIONS

2022 **Peabody Essex Museum**
Sonic Enrichment at the Zoo
PEM, Salem, MA

2022 **Women in Voice**
Voice Technology Beyond Words
Remote

2022 **Sonic Seasoning Workshop**
In Collaboration with PLIX, over 300 attendants
Cambridge Science Festival, Cambridge, MA

2022 **Ars Electronica**
Ars for Nons
Museum of the Future, Linz, Austria

2022 **RSA Security Convention**
Voice Biometrics Expert Panel
Moscone Center, San Francisco, CA

2021 **TEDxBoston**
How the voice touches and moves us: connections between hands and voice
The Quin, Boston, MA

2021 **Invited Special Guest – NPR Utah, Radio West**
20 years anniversary show of Radio West, NPR Utah
Rose Wagner Performing Arts Center, Salt Lake City, Utah

2021 **Invited Speaker, Honors Program, University of Utah**
Composing a Community
University of Utah, Salt Lake City, Utah

2021 **Podcast Interview for "The Mind Behind It"**
What does your voice say about you? By Huda Cadekiwala and Sahil Saluja
Remote

2021 **Podcast Interview for "The World"**
The Power and Intricacy of the Human Voice, By Christopher Von Roy
Remote

2021 **TeleAbsence**
With the Tangible Media Group / MIT Media Lab
Ars Electronica Garden Cambridge

2021 **Int. Workshop on Vocal Interaction between Humans, Animals, & Robots**
TamagoPhone: Augmented Incubator for Vocal Interactions During Artificial Incubation
Paris, France

2021 **IdeaStream 2021**
Real-time speech modification system to enhance fluency in people who stutter
Remote

2021 **Webstream Interview on Music and Healing**
By Patrick Summers - Houston Grand Opera
Remote

2020 **Invited Speaker at Rennée Fleming's Music & Mind Live web seminar**
The Inner Voice
Remote

2020   **Talk at Interspecies IO conference**
Ethics in interspecies vocal interaction (co-organizer)
Remote

2020   **Talk at CHI 2020**
Interspecies Interactions Mediated by Technology: An Case Study at the Zoo
Honolulu, Hawaii, USA

2020   **Making a Difference, Keynote Talk at Brilliant Labs**
Voice and all the senses
Remote

2019   **Talk at the OtherAbility Festival**
Voice and all the senses
Amsterdam, Netherlands

2018   **TED featured talk**
Why we don't like the sound of our own voice

2018   **Keynote at VMware**
Future of Voice Technology
Boston, MA

2018   **Exhibit of Enchanted Wear at Kulturhuset**
Digitally Enchanted Dress
Kulturhuset, Stockholm, Sweden

2017   **Talk at TEDxBeaconStreet**
Your Three Voices
Lincoln School, Brookline, MA

2017   **Cat Caffee: Pop-Up Exhibition at the MFA**
Performing Science at the Museum
Museum of Fine Art, Boston, MA

2017   **Demo at Hacking Consciousness Event**
Self Refleciton and the voice
Harvard Divinity School, MA

2017   **Digital Spa: Pop-Up Exhibition at the MFA**
Performing Science at the Museum
Museum of Fine Art, Boston, MA

2017   **Exhibition for the Opening of OpenMind:OpenArt Gallery**
I is plural wearable projection piece
MIT, MA

2017   **Series of Workshop in Tokyo**
Toyota, DENSO, Panasonic, Dentsu
Tokyo, Japan

2016   **Partition: Pop-Up Exhibition at the MFA**
Performing Science at the Museum
Museum of Fine Art, Boston, MA

2016   **Talk at the MIT Museum for Girl's day series**
Robotics and life choices
MIT Museum Cambridge, MA

2016   **Talk at the EMF camp 2016**
Inside the MIT Media Lab
Loseley Park, UK

	2015	**Workshop at the EMF camp 2016** Loseley Park, UK
	2015	**Exhibition at SIGGRAPH Art Gallery: Dandelion Diptych** Collaborators: Jie Qi and Nicole Teeny Los Angeles Convention Center, CA
	2015	**Workshop at the White House** Circuit stickers for "Take Our Daughters and Sons to Work Day" White House, Washington, DC
	2015	**Presentation at the Acera Innovator Symposium** "Changing minds: a craft of perception?" Acera School in 5 Lowell Ave, Winchester
	2015	**Talk at the MIT Museum Second Fridays Series** "Good Vibrations: From Music To Medicine" MIT Museum Cambridge, MA
	2015	**Vocal Vibrations: Multisensory exhibition at Le Laboratoire Cambridge** Collaborators: Tod Machover, Neri Oxman, Charles Holbrow Le Laboratoire Cambridge, 650 E Kendall St, Cambridge, MA
	2014	**Vocal Vibrations: Multisensory exhibition at Le Laboratoire Paris** Collaborators: Tod Machover, Neri Oxman, Charles Holbrow, Elly Jessop Le Laboratoire, 4 Rue du Bouloi, Paris, France
	2012	**The Other Festival, Interactive Installation** Migration project Collaborators: Jon Fergusson MIT Media Lab
	2012	**Hyperscore Workshop** Royal Opera House, London, UK
PERFORMANCE & PRODUCTION WORK	2018	Voice Research and Creative Tools **Philadephia Voices** (Symphony for orchestra, 300 singers, electronics by Tod Machover) Philadelphia Orchestra, Kimmel Center, Philadelphia, PE Philadelphia Orchestra, Carnegie Hall, New York, NY
	2015	Electronics Restoration and Preparation **Hyperstring Trilogy** (Pieces for hyperinstruments from Tod Machover) Luzern Festival, Switzerland
	2015	Conceptual and Textual Research **De L'Experience** (Piece for narrator, organ and electronics from Tod Machover) Maison Symphonique de Montreal, Canada
	2014	Robot Operator **Death and the Powers** and global multicast (Robotic Opera, music from Tod Machover, story and lyrics from Robert Pinsky) Winspear Opera House, Dallas TX
	2013	Hardware and Software Design, Author, Performer **Babel or not Babel** (performance for WOOD-WATER-WHISPER-WILD) MIT Media Lab, Cambridge MA
	2006	Performer with a professional theater troupe **Madani Compagnie**, France

TECHNICAL SKILLS	Coding skills	C, C++, Python, Java, SQL, JavaScript, MATLAB, R, Processing, openFrameworks
	Software	Audio and DAW (MaxMSP, Reaper, Abelton Live, Audacity, Praat, Modalys) Adobe Creative Suite (After Effect, Illustrator, Premiere Pro, Photoshop) , CAD /Animation (CATIA V6, Virtools, SolidWorks, Rhino, Maya, 3DS Max, Unity)
	Stat, Research	Machine Learning, Experimental Design, Significance Testing, Data Collection/Management/Visualization, DSP
	Fab skills	Machining (milling machines, lathe, CNC, laser cutting, water jet cutting), Forge (deep drawing, swaging), Casting (mold making, sand casting, die casting), 3D printing, 3D scanning, Electronics, PCB design, Robotics, CNC machine building, Musical instrument making, Ceramic, Egg Carving, Sewing, Printmaking
	Entrepreneurship	Market Research, I-Corps, Small Scale Manufacturing, Software Deployment, Fundraising, Managing
	Languages	French (Fluent), English (Fluent), German (Intermediate), Japanese (Beginner)

SELECTED AWARDS & GRANTS	2021	Obtain industrial funding from HARMAN Int. and lead funded research engagements (engagement budget $500,000/year)
	2021	Deshpande Grant for breakthrough technologies commercialization ($150,000) Contributed to proposal for the grant awarded to my supervisor
	2020	Deshpande Grant for breakthrough technologies commercialization ($50,000) Contributed to proposal for the grant awarded to my supervisor
	2020	McGovern Institute Neurotechnology (MINT) grant to develop new technologies for brain research ($100,000) Contributed to proposal for the grant awarded to my supervisor
	2018	First Prize in the Technical Usability category at MIT ATHACK (Assistive Technology Hackathon) for the Cipods project
	2017	Director's Grant from the Council for the Arts at MIT, Digital Spa project ($1,000)
	2017	Bill Mitchell Design Award for Connected Care, sponsored by BNP Paribas Cardiff, MIT ($4,000)
	2013 - 2020	International Fellowship (for service and mentoring of undergraduate community on international questions), MIT
	2017	Graduate Woman of Excellence Award, MIT
	2016	Director's Grant from the Council for the Arts at MIT, Fablur project
	2016	Audience award, Virtual Reality Hackathon, PitchPaint project
	2016	2nd Prize for Entertainment, Virtual Reality Hackathon, PitchPaint project
	2012	Magnes Scholarship, Paris
	2011	SOCE Grant, Paris
	2010	First Prize "2084 a brave new world?" ENSTA-ParisTech writing contest organised by the CEA (Commissariat à l'Energie Atomique), Paris
	2010	Prix d'Excellence Scientifique et Technique, from Ecole Nationale Superieure des Arts et Métiers ParisTech Graduate School, Lilles

PUBLICATIONS

THESES

Vocal Connection: Rethinking the voice as a medium for personal, interpersonal, and interspecies understanding
R. Kleinberger, Ph.D. Thesis. Massachusetts Institute of Technology 2020

Singing about Singing: Using the Voice as a Tool for Self-Reflection
R. Kleinberger, MS Thesis. Massachusetts Institute of Technology 2014

Musical virtual environment: an interactive machine vision tool for live performance
R. Kleinberger, MS Thesis. UCL Virtual Environment, Imaging and Visualisation 2013

IN PROCESS

Sonic and Vocal Enrichment for Animals in Managed Care
R. Kleinberger
Interaction Studies: Special issue on Animal-human computer interfaces
To be published in 2023

Book Chapter for Renée Fleming Music and Health book
R. Kleinberger, A. Rieger, T. Machover
To be published in 2023

JOURNAL & CONFERENCE PAPERS

Birds of a Feather Video-Flock Together: Agency-Based Parrot-to-Parrot Video-Calling System for Interspecies Ethical Enrichment
R. Kleinberger, J. Cunha, M. Vemuri, I Hirskyj-Douglas
CHI'23: ACM Conference on Human Factors in Computing Systems, Hamburg, Germany, 2023

Auditory Seasoning Filters: Altering Food Perception via Augmented Sonic Feedback of Chewing Sounds
R. Kleinberger, A. van Troyer, & W. J. Quin
CHI'23: ACM Conference on Human Factors in Computing Systems, Hamburg, Germany, 2023

Corsetto: A Kinesthetic Garment for Designing, Composing for, and Experiencing an Intersubjective Haptic Voice
O. Afsar, et al.
CHI'23: ACM Conference on Human Factors in Computing Systems, Hamburg, Germany, 2023

TamagoPhone: A framework for augmenting artificial incubators to enable vocal interaction between bird parents and eggs
R. Kleinberger, M. Vemuri, J. Sands, H. Sareen, J. Baker
ACI'22: Internationnal Conference on Animal-Computer Interactions, Newcastle, UK, 2022

Voice at NIME: a Taxonomy of Interfaces for Vocal Musical Expression
R. Kleinberger, N. Singh, X. Xiao, A. van Troyer
NIME'22: Conference on New Interfaces for Musical Expression, Aotearoa, New Zealand

Interspecies Interactions Mediated by Technology: An Avian Case Study at the Zoo
R. Kleinberger, A. Harrington, L. Yu, A. van Troyer, D. Su, J. Baker, G. Miller
CHI'20: ACM Conference on Human Factors in Computing Systems, Honolulu, USA, 2020

Fluency Effects of Novel Acoustic Vocal Transformations in People Who Stutter: An Exploratory Behavioral Study
R. Kleinberger, G. Stefanakis, S. Ghosh, T. Machover, M. Erkkinen
SNL'19: Society for the Neurobiology of Language, Helsinki, Finland, 2019

Supporting Elder Connectedness through Cognitively Sustainable Design Interactions with the Memory Music Box
R. Kleinberger, A. Rieger, J. Sands and J. Baker
UIST'19: User Interface Software and Technology, New Orleans, LA, USA, 2019

From Mondrian to Modular Synth: Rendering NIME using Generative Adversarial Networks
A. Van Troyer and R. Kleinberger
NIME'19: New Interface for Musical Expression, Porto Alegre, Brazil, 2019

Speech Companions: Evaluating the Effects of Musically Modulated Auditory Feedback on the Voice
R. Kleinberger, G. Stefanakis, and S. Franjou
ICAD'19: The 25th International Conference on Auditory Display, Newcastle, UK, 2019

SNaSI: Social Navigation through Subtle Interactions with an AI agent
R. Kleinberger, J. Huburn, M. Grayson and C. Morrison
RTD'19: Research Through Design, Delft, Netherlands 2019

Vocal Musical Expression with a Tactile Resonating Device and its Psychophysiological Effects
R. Kleinberger
NIME'18: New Interface for Musical Expression, Blacksburg, VA, USA 2018

Digitally Enchanted Wear: A Novel Approach in the Field of Dresses as Dynamic Displays
R. Kleinberger, A. Panjwani
TEI'18: International Conference on Tangible, Embedded, and Embodied Interactions, Stockholm, Sweden 2018

Learning from Lullabies: A Cognitive-Behavioral Exploration of the Role of Lullabies in Infant and Adult Well-Being
A. Rieger, R. Kleinberger
GAPS'17: Global Arts and Psychology Seminar,Tufts, Somerville, US, 2017

Dooremi: a Doorway to Music
R. Kleinberger, A. van Troyer
NIME'16: New Interfaces for Musical Expression, Brisbane, Australia, 2016

KinéPhone: Exploring the Musical Potential of an Actuated Pin-Based Shape Display
X. Xiao, D. D. Haddad, T. Sanchez, A. van Troyer, R. Kleinberger, P. Webb, J. Paradiso, T. Machover, H. Ishii
NIME'16: New Interfaces for Musical Expression, Brisbane, Australia 2016

PHOX Ears: Parabolic, Head-mounted, Orientable, eXtrasensory Listening Device
R. Kleinberger, G. Dublon, T. Machover, J. A. Paradiso
NIME'15: New Interfaces for Musical Expression, Baton Rouge, LA 2015

V3: an Interactive Real-Time Visualization of Vocal Vibrations
R. Kleinberger
SIGGRAPH'15: Computer Graphics and Interactive Techniques, Los Angeles, CA 2015

Vocal Vibrations: A Multisensory Experience of the Voice
C. Holbrow, E. Jessop, and R. Kleinberger
NIME'14: New Interfaces for Musical Expression, London, UK, 2014

Social agent or machine? The framing of a robot affects people's interactions and expressivity
J. Kory and R. Kleinberger
HRI 2014: ACM/IEEE International Conference on Human-Robot Interaction, 2014

PAMDI Music Box Primarily Analog-Mechanical, Digitally Iterated Music Box
R. Kleinberger
NIME'13: New Interfaces for Musical Expression, Daejeon + Seoul, Korea Republic 2013

Human-Computer Music Performance: From Synchronized Accompaniment to Musical Partner
NE. Gold, O. Sandu, PN. Palliyaguru, R. Dannenberg, A. Robertson, A. Stark, R. Kleinberger
SMCC'13: Sound and Music Computing Conference,Stockholm, Sweden 2013

3D-printing of non-assembly, articulated models
C. Jacques, D. Calian, C.Amati, R. Kleinberger, A. Steed, J. Kautz, T. Weyrich
SIGGRAPH Asia'12, Singapore 2012

ORGANISER

Interspecies I/O International Conference
co-organized with V. Cerf, P. Gabriel, N. Gershenfeld, D. Reiss 2020

Interspecies I/O International Conference
co-organized with V. Cerf, P. Gabriel, N. Gershenfeld, D. Reiss 2019

Underware: Aesthetic, Expressive, & Functional On-Skin Technologies
J. Paradiso, et al. ACM UbiComp/ISWC'16 workshop

OTHER

A Language for Empathy-based Design
R. Kleinberger, General Examination article

Nanometre 551
R. Kleinberger, Sci-Fi short novel published in book "2084, le meilleur ou le pire des mondes", broche, 2010

DIVERSITY & ADVOCACY		
	2020 - 2022	Neurodiversity in the workplace (participated and managed neurodiverse intern)
	2013 - 2020	Active listening (yearly training as part of International Fellow (IF) role)
	2013 - 2020	Unconscious bias (yearly training as part of IF role)
	2013 - 2020	Responding to bias incident (yearly training as part of IF role)
	2013 - 2020	Conflict resolution (yearly training as part of IF role)
	2013 - 2020	Inclusion, group and community dynamics (yearly training as part of IF role)

SERVICES		
	2023	Demo Chair for Audiomostly (conference on VR Sound Design)
	2022 - 2023	Paper Committee for TENOR (Technologies for Music Notation and Representation conference)
	2021 - present	Reviewer for INTERSPEECH (conference on Speech Communication)
	2019 - present	Reviewer for CHI (conference on Computer-Human Interactions)
	2017 - present	Reviewer for UIST (conference on User Interface Software and Technology)
	2017 - present	Reviewer for DIS (conference on Design of Interactive Systems)
	2015 - present	MIT Engineering Advisory Board for the MIT Maker Portfolios
	2014 - present	Reviewer for NIME (conference on New Interfaces for Musical Expression)
	2020 - 2022	Advisory Board of LUCID
	2013 - 2020	Graduate Resident Advisor - mentoring 30 undergraduate MIT students