

Tejaswinee Kelkar

PHD, MS, BE, B.Mus, AMUSTCL

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Summary

I am a musician and researcher in music technology with an interest in body movement and musical embodiment, melodic cognition, and musical chills. I have a wide range of skills from music performance, music production, and music analysis, to data science, statistics, and data visualization. I have lived in Nagpur, Hyderabad, and Chennai in India, and Osaka in Japan. I currently call Oslo, Norway my home.

Education

Doctor of Philosophy

Oslo, Norway

RITMO CENTER OF EXCELLENCE, UNIVERSITY OF OSLO

May. 2016 - Nov. 2019

- **Dissertation: Computational Analysis of Melodic Contour and Body Movement**
- Member: fourMs Research Group, RITMO Center of Excellence
- Member: Sound and Music Computing Nordic Network
- Member: AAAI - Acoustically Active Augmented Instruments
- Member: SoundTracer Project

M.S. in Computer Science and Engineering by Research

Hyderabad, India

IIIT HYDERABAD (INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY)

September 2012 - December. 2015

- **Masters Thesis:** Applications of Gesture and Spatial Cognition in Hindustani Vocal Music
- Member: Cognitive Science Lab
- Coursework: Artificial Neural Networks, Statistical Methods for Artificial Intelligence, Usability Engineering, Computational Linguistics, Introduction to Cognitive Science

B. Music (Sangeet Prabhakar) in North Indian Classical Music

Allahabad, India

PRAYAG SANGEET SAMITI

April 2014

First Division By Correspondence

AMus TCL Diploma in Western Classical Composition

London, England

TRINITY COLLEGE OF MUSIC, LONDON

December 2012

90 Credits for Musical Skills and Stylistic Development (Diploma By Examination)

Bachelor of Engineering in Industrial Engineering

Nagpur, India

RTM NAGPUR UNIVERSITY

April 2010

- **Bachelors Thesis:** Maintenance Optimization in Cattle Feed Manufacturing Plant

Dissertation

Title	<i>Computational Analysis of Melodic Contour and Body Movement</i> , November 2019, Oslo
Advisors	Dr Alexander Refsum Jensenius, Dr Rolf Inge Godøy
Evaluation Committee	Dr Stefania Serafin, Aalborg University; Dr Tuomas Eerola, Durham University; Dr Jonna Vuoskovski, University of Oslo

Short Abstract: The aim of this dissertation is to understand the role of embodiment in melodic contour perception. In other words, it studies how we move our bodies in response to music. Melodies play an important role in both speech and music. This thesis consists of two parts, the first part being a background section discussing the theoretical motivations and methods used. The second part is a collection of four articles. Each of the articles explores a dimension of melodic contour: verticality, motion metaphors, body use, and multi-feature correlational analysis. The empirical work is based on sound-tracing as an experimental paradigm. Two sound-tracing experiments were conducted, resulting in three datasets that have been used in the analyses. In the experiments, participants listened to 16 melodies from four different genres: operatic vocalise, jazz scatting, North-Indian singing, and Sámi joik. Infrared motion capture was used to record the participants' body movement, and the analysis is focused primarily on the movement of their hands. The sound analysis is based on signal processing algorithms for pitch detection and methods for contour representation. Cross-correlation of the data is performed using a range of methods from statistical hypothesis testing to canonical correlation analysis.

Music Education

Individual training with Pt Rajhans, Pt Wadegaonkar

Nagpur, India

HINDUSTANI CLASSICAL MUSIC

1998-2006

- Guru-disciple tradition of training in improvisation through north Indian classical vocal music

KM Conservatory of Music and Technology

Chennai, India

FOUNDATION COURSE IN WESTERN CLASSICAL MUSIC

April 2011

- **Thesis: Gendered voice of the Castrati**

- Modules: Academic Skills Development for Musicians, Music History and Analysis, Music Theory and Musicianship, Composition and Performance

Aalto University, Finland

Aalto, Finland

SMC SUMMER SCHOOL ON 'WAVE IN TIME AND SPACE'

July 2017

- Instructors: Vesa Välimäki, Lauri Savioja, Tapio Lokki, and Ville Pulkki
- Courses: Alias-free virtual analog signal processing, Geometric room acoustic modeling and artificial reverberation, Concert hall acoustics, and Parametric spatial audio processing

Hamburg University of Music and Theater

Hamburg, Germany

SMC SUMMER SCHOOL ON SOUND AND MUSIC COMPUTING

July 2016

- Instructors: Jean-Louis Giavitto, Georg Hajdu, Cat Hope, Johannes Kretz, Trond Lossius, Christiane Neuhaus, Geoffroy Peeters, Tim Ziemer
- Courses: Brain-computer music interfaces, Artificial neural networks for gesture recognition and complex mapping, Networked music performance and real-time music notation, Elaborate loudspeaker networks for wave-field synthesis and 3D spatialization techniques

Teaching Education

Software Carpentries Foundation

University of Oslo

SOFTWARE CARPENTRIES CERTIFIED INSTRUCTOR

2019

- The Carpentries project is a voluntary community of Instructors, Trainers, Maintainers, helpers, and supporters who share a mission to teach foundational computational and data science skills to researchers.

LINK Center for University Pedagogy

University of Oslo

GENERAL PEDAGOGICAL TRAINING PROGRAMME

Fall 2019

- Basis competence course in pedagogy including peer-review for instructors, and a pedagogical development paper assignment.

Employment

Doctoral Research Fellow

Oslo, Norway

RITMO CENTER OF EXCELLENCE, UNIVERSITY OF OSLO

May. 2016 - May. 2020

- **Thesis: Computational Analysis of Melodic Contour and Body Movement**
- fourMs Research Group, RITMO Center of Excellence
- Sound and Music Computing Nordic Network
- AAAI - Acoustically Active Augmented Instruments
- SoundTracer Project

VLEAD Project

IIIT Hyderabad, India

PROJECT ENGINEER

May. 2014 - Feb. 2016

- Set up a virtual lab for Hindustani Music at <http://music.virtual-labs.ac.in>
- Created a database of ragas
- Created, designed, and developed 25 experiments, and conducted User Testing

Cognitive Science Lab, IIIT Hyderabad

Hyderabad

RESEARCH ASSISTANT - HCI

Sep. 2012 - Sep. 2015

- Funded by Intel Ltd., worked on cognitive load minimization through design intervention
- Environments used: Javascript, HTML,
- Worked on error and exception handling design schemata

Hyderabad Western Music Foundation (HWMF)

Hyderabad

MUSIC TEACHER

Sep. 2012 - Feb. 2016

- Taught music theory, and voice to group and individual classes
- Conducted community singing instruction open to all

Publications

- KELKAR, T (2019, May). *Computational Analysis of Melodic Contour and Body Movement*. Doctoral Thesis submitted to the **Faculty of Humanities, University of Oslo**
- KELKAR, T, Roy, U, & Jensenius, A. (2018, September). *Evaluating a collection of Sound-Tracing Data of Melodic Phrases* In **Proceedings of the International Society for Music Information Retrieval Conference (ISMIR 2018)**. IRCAM, Paris.
- Patel-Grosz, Prity; Grosz, Patrick Georg; KELKAR, TEJASWINEE & Jensenius, Alexander Refsum (2018). Coreference and disjoint reference in the semantics of narrative dance, In Uli Sauerland & Stephanie Solt (ed.), **Proceedings of Sinn und Bedeutung 22**, vol. 2, ZASPiL 61. Leibniz-Zentrum Allgemeine Sprachwissenschaft (ZAS). Chapter in Vol. 2. s 199 - 216
- KELKAR, T, Jensenius, A. *Analyzing free-hand sound tracings of melodic phrases*. **Applied Sciences Special Issue on Sound and Music Computing**. Eds: Lokki, Tapio; Valimaki Vesa; Serafin Stephania.

- KELKAR, T, Jensenius, A. (2017, July). *Representation Strategies in Two-handed Melodic Sound Tracing*. In **Proceedings of the International Conference on Movement Computing (MOCO 2017)**. Goldsmiths, University of London, London.
- KELKAR, T, Jensenius, A. (2017, July). *Exploring Melody and Motion Features in “Sound Tracings”*. In **Proceedings of the Sound and Music Computing Conference (SMC 2017)**. Espoo, Finland.
- KELKAR, T., Mavalankar, A., Choppella, V. (2015, December). *Generation of Quizzes and Solutions based on Ontologies - a Case for a Music Problem Generator*. In **Proceedings of IEEE Technology for Education Conference (T4E)**. NIT Warangal, India.
- KELKAR, T., Ray, A., & Choppella, V. (2015, June). *SangeetKosh: An Open Web Platform for Music Education*. In **Proceedings of the The 15th IEEE International Conference on Advanced Learning Technologies (ICALT)**, June 2015, Taiwan.
- Roy, U., KELKAR, T., & Indurkha, B. (2014, June). *TrAP: An Interactive System to Generate Valid Raga Phrases from Sound-Tracings*. In **Proceedings of the 2014 conference on New interfaces for musical expression (NIME '14)**. Goldsmiths, University of London, London.
- KELKAR, T., & Indurkha, B. (2014 June). *A motion-based approach to analysis, notation and creation of Hindustani Music*. In **Proceedings of xCoAx2014: Computation Communication Aesthetics and X**. Universidade do Porto, Porto.
- KELKAR, T., Gadepalli, P., & Indurkha, B. (2013, December). *An Assistive Tool to Improve Usability of Error Dialogs*. In proceedings of IEEE Conference on Technologies and Applications of Artificial Intelligence (TAAI), Taiwan.

Talks

- Kelkar, Tejaswinee (August, 2018). *Data visualization in Python*. **Music Hack Lab, University of Oslo**.
- Kelkar, Tejaswinee (November, 2018). *Python Toolboxes for Mocap Analysis*, **International Workshop on Motion Capture, RITMO, University of Oslo**.
- Kelkar, Tejaswinee (September, 2017). *Motifs in Melodies* **Power of Motifs Conference, University of Oslo**.
- Kelkar, Tejaswinee (2017). *Historical Performance and the Indian Musical Tradition*. **International Musicological Society Conference, Tokyo University, Japan**. March, 2017.
- Kelkar, Tejaswinee & Jensenius, Alexander Refsum (2017). *Tracing melodies: An observation study of hand movements to vocal phrases from different musical cultures*. **European Society for Cognitive Sciences of Music Conference. University of Ghent, Belgium**. August 2017.
- Kelkar, T., & Indurkha, B. (2014, July). *Typology of gestures and motion metaphors in improvisation of Hindustani vocal music*. In **Proceedings of the Sixth Conference of the Society for Gesture Studies (ISGS): Gesture in Interaction. University of California, San Diego**.

Teaching

Co-Teacher in the MCT (Masters in Music, Communication and Technology) Program

Oslo

MCT4047 MUSIC AND MACHINE LEARNING

Jan. 2015 - PRESENT

- Responsible for programming Jupyter notebooks to help students learn Python, Librosa, and Scikit-Learn, and teaching deep learning models.

Girl Music Tech Camp

University of Oslo

INSTRUCTOR, COURSE DESIGNER

Oct 2019

- Designed and taught a five-day intensive workshop for high school women students to learn about music technology.

Sound Synthesis with Little Bits

University of Oslo

INSTRUCTOR

August 2019

- Designed coursework and taught Little Bits and sound synthesis.

Music Performances

- Nov 2019 **Utopia with MusicLab**, Oslo World Festival Oslo, Norway
- Oct 2019 **Improverk: Chicago Connections + Kelkar & Shrestha**, Kafe Hærverk Oslo, Norway
- Sep 2018 **Depot. Depository. Rays: 7 Channel Sculptural Soundscape (Installation Piece)**, Fotogalleriet, Oslo Oslo, Norway
- 2017-2018 **Data Jockeying with MusicLab**, MusicLab with Institute of Musicology and Realfagsbiblioteket, UiO Oslo, Norway
- June 2018 **Disembodied Voice - Solo Performance**, PhD Day at Realfagsbiblioteket, UiO Oslo, Norway
- 2018 **Jazz in Khartoum Feature Artist**, Improvised concert series Oslo, Norway
- Sep 2018 **Jazz in Khartoum feat. Agbalagba Daada, Oslo Jazzfestival**, Improvised music Oslo, Norway
- Sep 2017 **‘Cliche Raga - Neural Network Performance’**, at MMM...Alone and all of her sex University of Oslo
- Mar 2018 **Mad og Alverdens Musik**, Hindustani music Cph, Denmark
- Nov. 2016 **Eastern Daze Festival III, Vooruit**, Improvised Music Ghent, Belgium
- Aug. 2016 **with Tina Sani, Mela Festivalen**, Improvised concert Oslo, Norway
- Feb 2016 **Institute concert of Evening Ragas**, IIIT Hyderabad Hyderabad, India
- Dec 2015 **House Concert**, Improvised music Hyderabad, India
- Apr 2014 **An Evening Of Musical Conversations**, IIIT Hyderabad Hyderabad India
- Apr 2014 **An Evening Of Musical Conversations**, Saptaparni Hyderabad, India

Leadership Positions

2017-2018 Organizer for Reading Group on Signal Analysis , Department of Musicology	<i>University of Oslo</i>
2018-2019 Deputy Staff Representative , Steering Committee for the Faculty of Humanities	<i>University of Oslo</i>
2017-2019 Election Committee Representative , Department of Musicology	<i>University of Oslo</i>
2018-2019 Deputy PhD Student Representative , PhD Program Board, Faculty of Humanities	<i>University of Oslo</i>

Professional Activities

Nov 2019 Publicity Chair , International Society for Music Information Retrieval (ISMIR)	<i>Delft, Netherlands</i>
2019-2020 Reviewer , Springer Journal for Cognitive Processing	<i>Springer</i>
2019 Reviewer , International Society for Music Information Retrieval (ISMIR)	<i>Delft, Netherlands</i>
2019 Reviewer , International Conference on Movement and Computing (MOCO)	<i>Arizona, USA</i>
2019 Reviewer , New Interfaces for Music Information Retrieval (NIME)	<i>Porto Alegre, Brazil</i>
2018 Reviewer , New Interfaces for Music Information Retrieval (NIME)	<i>Virginia Tech</i>
2019 Reviewer , International Society for Music Information Retrieval (ISMIR)	<i>Delft, Netherlands</i>
2017 Reviewer , International Conference on Movement and Computing (MOCO)	<i>Goldsmiths, London</i>
2017 Reviewer , Systematic Musicology Conference (SysMus)	<i>QMUL, London</i>

Awards and Achievements

2014 Conference Presentation and Attendance , Travel grant from ACM-Women	
2009 Silver Medalist , All India University Vocal Championships	<i>Chennai India</i>
2008 Gold Medalist , All India West-Zone University Vocal Championships	<i>Mumbai, India</i>
2007 Silver Medalist , All India University Vocal Championships	<i>Medinapore, India</i>
2008 Gold Medalist , All India West-Zone University Vocal Championships	<i>Anand, India</i>
2006 Silver Medalist , All India University Vocal Championships	<i>Mumbai, India</i>
2006 Gold Medalist , All India West-Zone University Vocal Championships	<i>Ahmednagar, India</i>
2004-2005 International Youth Exchange Program , Exchange student to Kawachinagano High School	<i>Osaka, Japan</i>

Programming Languages

Operating Systems	Linux, Mac OS X, Windows
Programming	Python, HTML/Javascript, Matlab, C/C++, Max
Packages and Libraries	Scikit, Pandas, Librosa, Keras
Specialized Tools	LateX, Logic Pro 10, Sibelius, Sonic Visualizer, Praat, Adobe Photoshop

Press

Jan 2020 Noen Forsker På Musikk Helt På Ekte , Now's the Time, Jazznytt	<i>Oslo</i>
2016 Exceptional Engineers: Tejaswinee Kelkar On Her Experiments With Indian Classical Music And Beyond , Crazy Engineers Blog	<i>Pune</i>
April 2014 Unapologetically Vocal , The Hindu Newspaper	<i>Hyderabad</i>

Languages

English, Hindi, Marathi	Native proficiency
Japanese, Norwegian	B2/C1 Proficiency
Sanskrit, French, Tamil, Telugu	Conversational proficiency

Volunteering

2014-2015 AshaKiran school for underprivileged children , Music Teacher	<i>IIT Hyderabad</i>
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Hobbies

Swimming, Sketching, Cooking, Poetry