

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.

Employment

Data Analyst

UNIVERSAL MUSIC NORWAY AS, OSLO

- Big data analysis in SQL and Python
- Server scripting and data automation
- Visualization and modeling of time series data

Oslo, Norway

June. 2020 - present

Doctoral Research Fellow

DEPARTMENT OF MUSICOLOGY, FACULTY OF HUMANITIES, UNIVERSITY OF OSLO

- **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

Oslo, Norway

May. 2016 - May. 2020

VLEAD Project

PROJECT ENGINEER

- 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

RESEARCH ASSISTANT - HCI

- 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)

MUSIC TEACHER

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

IIIT Hyderabad, India

May. 2014 - Feb. 2016

Hyderabad

Sep. 2012 - Sep. 2015

Hyderabad

Sep. 2012 - Feb. 2016

Education

Doctor of Philosophy

RITMO CENTER OF EXCELLENCE, UNIVERSITY OF OSLO

- **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

Oslo, Norway

May. 2016 - Nov. 2019

M.S. in Computer Science and Engineering by Research

IIIT HYDERABAD (INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY)

- **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

Hyderabad, India

September 2012 - December. 2015

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

PRAYAG SANGEET SAMITI

First Division By Correspondence

Allahabad, India

April 2014

AMus TCL Diploma in Western Classical Composition

TRINITY COLLEGE OF MUSIC, LONDON

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

London, England

December 2012

Bachelor of Engineering in Industrial Engineering

RTM NAGPUR UNIVERSITY

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

Nagpur, India

April 2010

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

HINDUSTANI CLASSICAL MUSIC

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

Nagpur, India

1998-2006

KM Conservatory of Music and Technology

FOUNDATION COURSE IN WESTERN CLASSICAL MUSIC

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

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

Chennai, India

April 2011

Aalto University, Finland

SMC SUMMER SCHOOL ON 'WAVE IN TIME AND SPACE'

• 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

Aalto, Finland

July 2017

Hamburg University of Music and Theater

SMC SUMMER SCHOOL ON SOUND AND MUSIC COMPUTING

• 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

Hamburg, Germany

July 2016

Teaching Education

Software Carpentries Foundation

SOFTWARE CARPENTRIES CERTIFIED INSTRUCTOR

• 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.

University of Oslo

2019

LINK Center for University Pedagogy

GENERAL PEDAGOGICAL TRAINING PROGRAMME

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

University of Oslo

Fall 2019

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

MCT4047 MUSIC AND MACHINE LEARNING

Oslo

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

INSTRUCTOR, COURSE DESIGNER

University of Oslo

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

INSTRUCTOR

University of Oslo

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 Hæverket	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) Conference 2019	<i>Delft, Netherlands</i>
2019-2020	Reviewer , Springer Journal for Cognitive Processing	<i>Springer</i>
	Reviewer , International Society for Music Information Retrieval (ISMIR), International Conference on	
2017-2020	Movement and Computing (MOCO), New Interfaces for Music Information Retrieval (NIME), Systematic Musicology Conference (SysMus)	

Awards and Achievements

2014	Conference Presentation and Attendance , Travel grant from ACM-Women	
India	Gold Medalist , All India West-Zone University Vocal Championships	<i>2007-2009</i>
India	Silver Medalist , All India University Vocal Championships	<i>2007-2009</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, SQL, bash, HTML/Javascript, Matlab, C/C++, Max
Packages and Libraries	Scikit, Pandas, Librosa, Keras
Specialized Tools	LateX, Tableau, Apache Airflow, Domo, Logic Pro 10, Sibelius, Sonic Visualizer, Praat, Adobe Photoshop

Media Coverage

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	Beginner

Volunteering

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