

# André Holzapfel

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CONTACT INFORMATION	Royal Institute of Technology (KTH) Lindstedtsvägen 3, Level 6, Room 1629 100 44 Stockholm Sweden	holzap@kth.se www.rhythmos.org
CITIZENSHIP	German	
RESEARCH AREAS	<ul style="list-style-type: none"><li>• Sound and music computing.</li><li>• Bayesian time series models, with a focus on rhythm and meter in music.</li><li>• Ethnomusicology, with a focus on musics from Crete (Greece).</li></ul>	
EDUCATION	<p><b>Istanbul Technical University, Center for Advanced Studies in Music (MIAM)</b>, Istanbul, Turkey</p> <p>2nd Ph.D., Music, enrolled in October 2012</p> <ul style="list-style-type: none"><li>• Thesis topic: Sound and movement in traditional dances in the island of Crete</li><li>• Advisor: Robert Reigle, Area of Study: Ethnomusicology</li></ul> <p><b>University of Crete</b>, Heraklion, Greece</p> <p>1st Ph.D., Computer Science, March 2010</p> <ul style="list-style-type: none"><li>• Thesis topic: Similarity methods for computational ethnomusicology</li></ul> <p>M.S., Computer Science, September 2006</p> <ul style="list-style-type: none"><li>• Thesis topic: A component based music classification approach</li></ul> <p>Advisor: Yannis Stylianou, Area of Study: Music Information Retrieval.</p> <p><b>University of Applied Sciences Düsseldorf</b>, Düsseldorf, Germany</p> <p>Diplomingenieur, Media Technology, July 2004</p> <ul style="list-style-type: none"><li>• Thesis Topic: Development of a classifier for a speech recognition system based on a Relevance Vector Machine</li><li>• Advisor: Professor H.G. Meier, Area of Study: Speech recognition.</li></ul>	
PROFESSIONAL EXPERIENCE	<p><b>Royal Institute of Technology (KTH)</b>, Stockholm, Sweden</p> <p><i>Assistant Professor</i> <span style="float: right;"><b>since 10/2016</b></span></p> <ul style="list-style-type: none"><li>• Specialization in Sound and Music Computing, within the Department of Media Technology and Interaction Design (MID).</li></ul> <p><b>Austrian Research Institute for Artificial Intelligence (OFAI)</b>, Vienna, Austria</p> <p><i>Postdoctoral Researcher</i> <span style="float: right;"><b>10/2015-09/2016</b></span></p> <ul style="list-style-type: none"><li>• Bridging gaps between mathematics and music information retrieval.</li></ul>	

**New York University Abu Dhabi (NYUAD)**, Abu Dhabi, UAE

*Visiting Researcher*

**10/2014 to 12/2014**

- Three month visit in order to initiate a long-term research project on interactive educational tools for Arabic music.

**Boğaziçi University**, Istanbul, Turkey

*Postdoctoral Researcher* **05/2013 to 09/2014, 01/2015 to 07/2015**

- Generic frameworks based on probabilistic models for modeling rhythm, music transcription and alignment.
- Research funded by Marie Curie IEF scholarship (title “RhythMus”).

**Universitat Pompeu Fabra**, Barcelona, Spain

*Postdoctoral Researcher*

**05/2012 to 04/2013**

- Computational analysis of tonal and rhythmic properties of Turkish Makam music.
- Research conducted in the Compmusic project (ERC).

**INESC Porto**, Porto, Portugal

*Postdoctoral Researcher*

**04/2011 to 03/2012**

- Signal representations for beat tracking and rhythmic similarity.
- Interactive tools for music generation and creation.

**Austrian Research Institute for Artificial Intelligence (OFAI)**, Vienna, Austria

*Postdoctoral Researcher*

**09/2010 to 02/2011**

- Improvement of rhythmic content descriptors for music similarity.
- Background music detection in broadcast news.

**Technological Educational Institute of Crete, Dept. of Music Technology & Acoustics**, Rethymnon, Greece

*Lecturer*

**09/2009 to 06/2010**

- Courses: Audio & Music Programming Environments; Sound Synthesis II; Multimedia Applications (Photoshop, Director).

GRANT  
EXPERIENCE

- **Lise Meitner project (FWF), Austria (2016):** "A deeper understanding of common elements in musical rhythm".

**Marie Curie Actions - Intra-European Fellowships (IEF), 2013-2015:** postdoctoral grant, FP7-PEOPLE-2012-IEF, "RhythMus - A generic framework for analyzing temporal structure in music".

- **UT Austin-Portugal, 2011-2012:** Foundation of Science and Technology (FCT) postdoctoral grant, Project title: Music Synthesis by Analysis.
- **DAAD scholarship, 2005-2006** (M.S. studies).

## SCIENTIFIC ACTIVITIES

### Coorganizer

- Lorentz workshop: "Computational Ethnomusicology: Methodologies for a New Field", Leiden, Netherlands, 2017.
- Workshop on Folk Music Analysis (FMA) 2014, Istanbul, Turkey.

### Conference Tutorials

- Why is Greek music interesting? Towards an ethics of MIR, ISMIR 2014 conference

### Program-committee member

- International Society for Music Information Retrieval Conference (ISMIR), 2013, 2014, and 2015.
- Analytic Approaches to World Music (AAWM), 2015.

### Editor (Journals)

- Analytic Approaches to World Music Journal (Associate Editor)

### Reviewer (Journals)

- EURASIP Journal on Audio, Speech, and Music Processing; IEEE Journal of Selected Topics in Signal Processing; IEEE Transactions on Audio, Speech and Language Processing; IEEE Signal Processing Letters; Journal of New Music Research; Journal of Interdisciplinary Music Studies; Music Perception

### Reviewer (Conferences)

- Sound and Music Computing Conference (SMC); International Society for Music Information Retrieval Conference (ISMIR); Workshop on Folk Music Analysis (FMA); International Computer Music Conference (ICMC); Audio Engineering Society International Conference (AES); IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)

### Field work

- Crete, Greece: Participation in field work organized by the Institute of Musicology at the University of Vienna. Principal tasks: interviews and coordination.

**July-August 2011, July-August 2014, August 2015**

- Porto, Portugal: Field work in the course of the production of a documentary movie on the amateur Fado music in the city of Porto. Principal tasks: Production and direction.

**October 2012, April 2014**

## GENERAL SKILLS

Musical experience: many years of experience in guitar, oud (teachers: Bekir Şahin Baloğlu, Yurdal Tokçan, Necati Celik), and Cretan lute (teacher: Dimitris Sideris); singing lessons both in classical Western and Ottoman music (teacher: Bora Uymaz).

Languages: German (native), English (fluent), Greek (fluent), Turkish (basic), Portuguese (basic)

**Journal papers**

1. Emmanouil Benetos and Andre Holzapfel. High-resolution multi-pitch detection for transcribing microtonal music. *Journal of the Acoustical Society of America*, 138(4):2118-2130, 2015.
2. Florian Krebs, Andre Holzapfel, Ali Taylan Cemgil, and Gerhard Widmer. Inferring metrical structure in music using particle filters. *IEEE Transactions on Audio, Speech and Language Processing*, 23(5):817-827, 2015.
3. Andre Holzapfel. Relation between surface rhythm and rhythmic modes in Turkish makam music. *Journal for New Music Research*, 44(1):25-38, 2015.
4. Ajay Srinivasamurthy, Andre Holzapfel, and Xavier Serra. In search of automatic rhythm analysis methods for Turkish and Indian art music. *Journal for New Music Research*, 43(1):94-114, 2014.
5. Sertan Şentürk, Andre Holzapfel, and Xavier Serra. Linking scores and audio recordings in makam music of Turkey. *Journal for New Music Research*, 43(1):34-52, 2014.
6. Baris Bozkurt, Ruhi Ayangil, and Andre Holzapfel. Computational analysis of makam music in Turkey: review of state-of-the-art and challenges. *Journal for New Music Research*, 43(1):3-23, 2014.
7. Olmo Cornelis, Joren Six, Andre Holzapfel, and Marc Leman. Evaluation and recommendation of pulse and tempo annotation in ethnic music. *Journal for New Music Research*, 42(2):131-149, 2013.
8. Andre Holzapfel, Matthew E. P. Davies, José R. Zapata, Joao Lobato Oliveira, and Fabien Gouyon. Selective sampling for beat tracking evaluation. *IEEE Transactions on Audio, Speech and Language Processing*, 20(9):2539-2548, 2012.
9. Andre Holzapfel and Yannis Stylianou. Scale transform in rhythmic similarity of music. *IEEE Transactions on Audio, Speech and Language Processing*, 19(1):176-185, 2011.
10. Andre Holzapfel, Yannis Stylianou, Ali C. Gedik, and Baris Bozkurt. Three dimensions of pitched instrument onset detection. *IEEE Transactions on Audio, Speech and Language Processing*, 18(6):1517-1527, 2010.
11. Andre Holzapfel and Yannis Stylianou. Musical genre classification using Non-negative Matrix Factorization based features. *IEEE Transactions on Audio, Speech and Language Processing*, 16(2):424-434, 2008.
12. N. d'Alessandro, O. Babacan, B. Bozkurt, T. Dubuisson, A. Holzapfel, L. Kessous, A. Moinet, M. Vlieghe, and T. Dutoit. Ramcess 2.x framework - expressive voice analysis for realtime and accurate synthesis of singing. *Journal on Multimodal User Interfaces*, 2:133-144, 2008.

## Book chapters

1. Andre Holzapfel. Patterns of identity: Rhythmic and melodic aspects of Cretan leaping dances. In *Music on Crete, Traditions of a Mediterranean island*. Vienna Series in Ethnomusicology, in press, 2016.

## International Conferences

1. Andre Holzapfel and Thomas Grill. Bayesian meter tracking on learned signal representations. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, 2016.
2. Andre Holzapfel and Emmanouil Benetos. The Sousta corpus: Beat-informed automatic transcription of traditional dance tunes. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, 2016.
3. Ajay Srinivasamurthy and Andre Holzapfel and Ali Taylan Cemgil and Xavier Serra. A generalized Bayesian model for tracking long metrical cycles in acoustic music signals. In *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2016.
4. Andre Holzapfel. Computational Analysis of Melodic Motives in Cretan Leaping Dances: Motivations, Perspectives, and Limitations. In *3rd International Conference on the music tradition of Eastern Crete*, 2015.
5. Andre Holzapfel. A corpus study on rhythmic modes in Turkish makam music and their interaction with meter. In *15. Congress of the Society for Music Theory*, 2015.
6. Ajay Srinivasamurthy and Andre Holzapfel and Ali Taylan Cemgil and Xavier Serra. Particle Filters for Efficient Meter Tracking with Dynamic Bayesian Networks. In *Proceedings of ISMIR - International Society for Music Information Retrieval Conference*, 2015.
7. Andre Holzapfel. Melodic key phrases in traditional Cretan dance tunes. In *Proceedings of the 5th Workshop on Folk Music Analysis*, 2015.
8. Andre Holzapfel and Umut Şimşekli and Sertan Şentürk and Ali Taylan Cemgil. Section-level modeling of musical audio for linking performances to scores in Turkish makam music. In *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2015.
9. Andre Holzapfel and Florian Krebs and Ajay Srinivasamurthy. Tracking the “odd”: meter inference in a culturally diverse music corpus. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, 2014.
10. Dave Fossom and Andre Holzapfel. Exploring the music of two masters of the Turkmen dutar through timing analysis. In *Proceedings of the 4th Workshop on Folk Music Analysis*, 2014.
11. Andre Holzapfel and Baris Bozkurt. Relation between phrase and meter in Turkish makam music. In *Proceedings of the 4th Workshop on Folk Music Analysis*, 2014.
12. Emmanouil Benetos and Andre Holzapfel. Incorporating pitch class

- profiles for improving automatic transcription of Turkish makam music. In *Proceedings of the 4th Workshop on Folk Music Analysis*, 2014.
13. Andre Holzapfel. Leaping dances in Crete: Tradition in motion. In *Conference on Analytic Approaches to World Music*, 2014.
  14. Emmanouil Benetos and Andre Holzapfel. Automatic transcription of Turkish makam music. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, 2013.
  15. Andre Holzapfel. Tempo in Turkish improvisation. In *Proceedings of the 3rd Workshop on Folk Music Analysis*, 2013.
  16. Marius Miron, Fabien Gouyon, Matthew E.P. Davies, and Andre Holzapfel. Beat-station: A real-time rhythm annotation software. In *Proceedings of Sound and Music Computing Conference (SMC)*, 2013.
  17. Costas Panagiotakis, Andre Holzapfel, Damien Michel, and Antonis Argyros. Beat synchronous dance animation based on periodic motion and music tempo analysis. In *Proceedings of the 9th International Symposium on Visual Computing (ISVC)*, 2013.
  18. Andre Holzapfel and Baris Bozkurt. Metrical strength and contradiction in Turkish makam music. In *2nd CompMusic Workshop*, 12/07/2012 2012.
  19. Andre Holzapfel, Matthew Davies, Jose Ricardo Zapata, Joao Lobato Oliveira, and Fabien Gouyon. On the automatic identification of difficult examples for beat tracking: towards building new evaluation datasets. In *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2012.
  20. George Sioros, Andre Holzapfel, and Carlos Guedes. On measuring syncopation to drive an interactive music system. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, 2012.
  21. Jose Ricardo Zapata, Matthew E. P. Davies, Andre Holzapfel, Joao L. Oliveira, and Fabien Gouyon. Assigning a confidence threshold on automatic beat annotation in large datasets. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, 2012.
  22. Andre Holzapfel, Arthur Flexer, and Gerhard Widmer. Improving tempo-sensitive and tempo-robust descriptors for rhythmic similarity. In *Proceedings of the Conference on Sound and Music Computing (SMC)*, 2011.
  23. Andre Holzapfel, Gino Angelo Velasco, Nicki Holighaus, Monika Dörfler, and Arthur Flexer. Advantages of nonstationary Gabor transforms in beat tracking. In *Proceedings of ACM Multimedia*, 2011.
  24. Andre Holzapfel and Yannis Stylianou. Parataxis: Morphological similarity in traditional music. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, 2010.
  25. Emmanouil Benetos, Andre Holzapfel, and Yannis Stylianou. Pitched instrument onset detection based on auditory spectra. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, 2009.

26. Andre Holzapfel and Yannis Stylianou. A scale transform based method for rhythmic similarity of music. In *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 317–320, 2009.
27. Andre Holzapfel and Yannis Stylianou. Rhythmic similarity in traditional Turkish music. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, 2009.
28. Andre Holzapfel and Yannis Stylianou. Rhythmic similarity of music based on dynamic periodicity warping. In *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing. ICASSP*, pages 2217–2220, 2008.
29. Andre Holzapfel and Yannis Stylianou. Beat tracking using group delay based onset detection. In *Proceedings of ISMIR - International Conference on Music Information Retrieval*, pages 653–658, 2008.
30. Maria Markaki, Andre Holzapfel, and Yannis Stylianou. Singing voice detection using modulation frequency features. In *Proceedings of ISCA Tutorial and Research Workshop on Statistical and Perceptual Audition (SAPA)*, 2008.
31. T. Dutoit, A. Holzapfel, M. Jottrand, A. Moinet, J. Perez, and Y. Stylianou. Towards a voice conversion system based on frame selection. In *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2007.
32. Andre Holzapfel and Yannis Stylianou. A statistical approach to musical genre classification using non-negative matrix factorization. In *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2007.
33. Andre Holzapfel and Yannis Stylianou. Singer identification in rembetiko music. In *Proceedings of the Conference on Sound and Music Computing (SMC)*, 2007.