Editor's foreword

Typical for today's information society is our use of interactive and digital media. In almost any situation, whether we are on the bus, on the street, in the café, or at home, we have a digital device of some sort close at hand. It is generally easy to pick up and fascinating to use, and with simply the touch of a fingertip on the screen, we can connect, chat, and otherwise interact with friends, family, or anyone at all. If we want to lock out the physical world around us, we can plug in our earphones, close our eyes, and listen to music from our self-made playlists. Who could have imagined such possibilities even ten to fifteen years ago?

Clinical psychologist Sherry Turkle says that our digital era, and especially our social networks, changes not only what we do but also who we are. In her book *Alone Together*, she argues that technology appeals to us most where we are most vulnerable in terms of our need to belong, and to feel part of something bigger. However, she continues, because digital media create an illusion of companionship without the actual presence (and demands) of it, they in fact offer only a new form of isolation. While this may be true, if we cannot go backward, we might as well look ahead. How can technology become a means of inclusion instead? How can we develop and design technology that hinders the spread of digitally enabled isolation and instead fosters new ways of participating in the digital society for everyone, including those who are illiterate, handicapped, or simply unwilling or unable to adapt to the digital world? In the context of the interactive and musical potentials that are built into this kind of media, it is also relevant to ask another question: How can we develop the technology to improve health and well-being through musical-technological means for all of us?

The present volume, which is the eighth anthology published in this Series by the Centre for Music and Health at the Norwegian Academy of Music, presents a compilation of articles that explore the many intersections among music, health, technology, and design. These studies all engage with the use, development, and design of interactive and digital media for the potential health benefit of users with some kind of physical or mental needs. They also share a notion of health in a prophylactic and preventive sense, as something that can be maintained continuously through meaningful and life-fulfilling activities, both by oneself and with others and with technological media.

The book is divided into two parts. The first and larger part includes articles deriving from the on-going Norwegian multidisciplinary qualitative research project called RHYME. The second part includes articles from a selection of

well-known international researchers in the field of music, technology, and health. I will begin this introduction by presenting the RHYME project.

The Research Council of Norway finances the RHYME project through the VERDIKT program for a research period that extends from 2010 through 2015. The project is still in its final test rounds as this book is being published. The research team embodies collaboration among the fields of interaction design, tangible interaction, industrial design, universal design, and music and health, with individuals from the Department of Design, Oslo School of Architecture and Design, the Department of Informatics, University of Oslo, and the Centre for Music and Health, Norwegian Academy of Music. In essence, the RHYME project explores ways in which families that include people with or without disabilities might experience the act of creating something together through the use of things whose design integrates interactive information technology. The project fosters a new treatment paradigm based on collaborative and interactive net-based musical 'smart things' with multimedia capabilities, situated within a broad perspective on health. These things, which are tangible and evoke both pillows and toys, are called 'co-creative tangibles' (CCTs). At the outset, the overall agenda of the RHYME project was to develop three generations of prototypes focused on different communication situations:

1) A tangible multimedia solution to facilitate communication, collaboration and co-creation between two people that would focus on the tangible, visual and auditive qualities of the multimodal user interface and especially the ways in which it might be designed to motivate collaboration over an extended period.

2) A tangible mobile multimedia solution for communication, collaboration and co-creation in social networks that would focus on the social-networking aspects of a mobile user interface and services and especially the ways in which it be designed to motivate multiple individuals to play and collaborate in the same physical space over an extended period.

3) Tangible distributed communication, collaboration and co-creation that would focus on the qualities of distributed multimodal user interfaces and the ways in which design might be made to motivate multiple individuals to play and collaborate over an extended period while separated in time and/or space.

Through processes based upon action research, a large amount of data from the test periods, including video clips, logs, interviews, and questionnaires, has been gathered in RHYME. Based on these sources of information, new prototypes of CCTs were developed. The reader can learn about the project on the project's web cite at www.rhyme.no created by Birgitta Cappelen.

Birgitta Cappelen is also the designer of the musical and interactive tangibles, and together with Anders-Petter Andersson, the sound designer, they describe the design process and the development of the four generations of the CCTs in this anthology's first article. Based on their experiences they suggest their notion, 'Musicking Tangibles', to be both an approach in RHYME and a novel perspective. According to them, the concept of Musicking Tangibles combines a humanistic, resource and empowerment oriented health approach with an aesthetic and culture based design approach towards music technology. This way Musicking Tangibles creates an arena where there is no right or wrong actions.

During the RHYME experiments it was evident that the possibilities to explore their voice through the microphone was of special interest for the children with disabilities. In their next article, Anders-Petter Andersson and Birgitta Cappelen describe the various vocal and tangible interactions in RHYME. They refer to music therapy theories and combine these with knowledge from multi-sensory stimulation. They also adopt vocal composition and improvisation techniques from music therapy, with the goal to inform their own design practices in the field of Interaction Design, Assistive Technologies, Musicology and Interactive Sound Design.

Even Ruud and I, as the editor, represent the Centre for Music and Health at the Norwegian Academy of Music in the RHYME project.[1] Together with Ingelill Eide, we contributed articles that discuss the following music- and health-oriented question: How do the participating children and/or their family members and close others relate to and interact with interactive and musical CCTs, and in what ways might their interaction become potentially health promoting for them? This question goes to the heart of the RHYME project in attempting to ascertain whether the CCTs can motivate participants to engage in active play and co-creation. As stated in RHYME's project description, the vision is that the CCTs, by expanding the possibilities for communication, help individuals to improve their health, sense of well-being and life quality, and at the same time reduce passivity and isolation.[2]

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1 The fact that I hold a postdoctoral position in RHYME and am responsible for the gathering and evaluation of the data explains why my authorship is represented in several articles here.

2 The RHYME articles in the present volume are coordinated among one another, but because each will also be accessible online eventually, I have chosen to reintroduce information about the RHYME project. These article sections are marked as 'similar' in the footnotes.

This vision is approached from a music and health perspective in the following empirical and theoretical articles in the RHYME section of this anthology.

The article written by Karette Stensæth and Even Ruud is an extended discussion of the empirical, theoretical and methodological aspects of the first RHYME experiments (which we have called 'actions') in 2011. These actions involved CCTs named ORFI, which included a set of twenty pyramid-shaped objects that looked like toys and/or pillows. Many of the users called them 'the fun orange and black pillows'. To begin a microanalysis of a selection of video samples of two children with rather different disabilities, Stensæth and Ruud ask: How do 'Ulla' and 'Frode' relate to and interact with ORFI, and in what ways can their interaction become potentially health promoting? How could music therapy profit from interactive technology of health?

The point of departure in the following article, written by Stensæth is the testing of the CCTs known as the WAVE in 2012, which offers many cross-media possibilities for interaction and was developed on the basis of the ORFI evaluation the year before. To respond to some of the requests that emerged during the ORFI actions, the WAVE designers built in a microphone and a camera. This article focuses on these new elements via the experiences of two children with disparate disabilities, an active girl named 'Petronella' who loves the microphone and a more passive boy named 'Dylan' who loves the camera. This study's data collection includes a video analysis triangulated with a focus interview conducted with a group of professional experts to elicit their observations regarding the video footage. The research question is as follows: Why do the two children relate so differently to the same musical and interactive CCT, and what would facilitate the most meaningful and health-promoting co-creation experience for each of them?

The next article, which is also empirical and also written by Stensæth, is a case study that looks at how a lively girl with Down syndrome, together with her mother, father and grandmother, experiences the CCTs known as REFLECT, which was developed for the RHYME tests in 2013. Once again different from its predecessors, ORFI and WAVE, REFLECT has RFID tags, a type of technology that requires that participants scan one CCT onto another to activate the music through the RFID reader. Data were recorded via video observations of the family while they explored REFLECT, and an interview was done with the family immediately following their second experience with the platform. The question Stensæth asks is as follows: How does one family experience REFLECT, and how might their musicking with REFLECT potentially enhance their quality of life?

Ingelill Eide, who has also written her master's thesis in music therapy on RHYME, takes Umberto Eco's aesthetic ideal of the *Open work*, as well as his

concept of the *Field of possibilities*, as her operative analytical models in the next article. She explores how a group of users activates certain types of dualities inherent in the CCTs in their co-creation with the musical and interactive media, including object/agent, predictable/unpredictable, structured/unstructured, and field/agent. Eide finds that the activation of these dualities is vitalizing for the users and can in turn be framed in relation to health. She draws upon a qualitative research design with structured analysis and five semi-structured interviews with the close others who assisted the children to answer her research question: Can Eco's concept of a Field of possibilities explain the dualities found in the CCTs developed in the RHYME project, and if so, how does it affect our understanding of co-creation as vitalizing and health promoting?

Even Ruud, presents a theoretical exploration of the health affordances of the RHYME artefacts in response to the following questions in the following article: To what extent can the RHYME project be seen within the theoretical framework of cultural psychology? How might concepts like 'artefact' and 'affordance' prove helpful to our understanding of the health benefits of the musical co-creative tangibles? He concludes that if we regard the CCTs in RHYME as artefacts, whether material or ideal, we come to appreciate the ways in which the aesthetic aspects of their design features, as well as the programming code of their interactive music, are novel scripts that inform our existing schemas for such 'musical objects'. Another question that derives from his discussion is as follows: Can interactive and musical media such as those in RHYME broaden our understanding of how we can promote health through music?

The research team for RHYME has also realized that words and concepts are interpreted differently in different fields. In the next article, Stensæth, together with Harald Holone and Jo Herstad, takes an interdisciplinary stance to elaborate upon the central project notion of *participation*. They address the following research questions: How is participation described in the disciplines of informatics and music and health, and what does participation imply in the RHYME project? To promote some common ground here, they also ask the following: How does the focus on user participation in the RHYME prototype evaluations differ for informatics researchers and for health and music researchers, and with regard to participation, what can the fields of music and health and informatics learn from one another?

The other part of this anthology is devoted to research projects other than RHYME. Alexander R. Jensenius, a Norwegian music researcher and research musician working in the fields of embodied music cognition and new interfaces for musical expression, discusses a set of video-based visualization techniques that he has developed for the analysis of music-related body motion. He describes how

these techniques have been used in studies of music and dance performances, and how they have unexpectedly proven useful in laboratory experiments for the documentation of the diagnosis of attention-deficit/hyperactivity disorder and clinical studies of cerebral palsy.

In the next article, Jaakko Erkkilä, Esa Ala-Ruona, and Olivier Lartillot, three prominent Finnish researchers in the areas of music therapy and music technology, discuss the use of technology in clinical improvisation. They elaborate upon a process that ranges from production and playback to analysis and interpretation. They also present the music therapy toolbox (MTTB), which was created at the University of Jyväskylä, Finland, for the purpose of computational music therapy improvisation analysis in the context of a research project called 'Intelligent Music Systems in Music Therapy' funded by the Academy of Finland. Aside from providing updated insights into processes that involve modern technology in the field of music therapy, this article usefully illustrates some of the ways in which music technology can be utilized in everyday clinical practice.

Lastly, another prominent researcher in music therapy, Wendy L. Magee from the United Kingdom, who recently edited a book on music technology in therapy and health settings, has contributed an article on gender and age aspects of technology and music (therapy). Magee uses a narrative style to look at the impact of these factors on music therapists and the people with whom they work. She finds that age and/or gender can impact upon the 'comfort' factor for both client and therapist, as may other factors, such as ethnicity, cultural background and socio-economic wealth. Magee's article returns to Turkle's critical question: How can we keep technology from becoming another experience of exclusion?

One could question where we go from here. In another anthology from the same series as this one, Edvin Schei (2009, p. 10) notes how important it is to remember that machines do not break if they lack beauty, recognition and self-expression, people do! I have learned from my participation in RHYME and from editing this anthology that technology appears to be valuable for inclusion, human interaction and health promotion. In some cases the technological medium can even emerge as an ecological tool – one that supports the individual human being in 'becoming one's fullest potential for individual and ecological wholeness' (Bruscia, 1998, p. 84). For this to happen, however, we must be utterly aware of *how* and *why* we relate to the medium in whatever way we do. Along those lines, one of the participants in RHYME commented, 'Ideally, the CCTs, to allow for meaningful co-creation, should have some of the same qualities as a good close other'. We might then wonder whether it is the *flexibility* that close others demonstrate when they co-create with children with disabilities that facilitates meaningful activities

and promotes a healthy interaction? Likewise, can we bring that flexibility to our devices? A mother who was involved in the project also pointed out, 'We need things to do at home, together – things that are meaningful for all of us, over time!' This is harder than it sounds, but it is my devout hope that the articles collected in this volume begin to trace the ways in which technology, properly harnessed and adapted – properly flexible – can contribute in that regard. Who knows, perhaps our future home environments will have musical and interactive media that can operate as agents of health promoting co-creation? For this to happen, I believe the design must be universal to include the needs of all of us. I also believe it is of major significance that people across disciplines and schools of thoughts talk together to approach a common ground of understanding.

I wish to acknowledge the institutions and people who contributed to the realization of this anthology, and in the RHYME project more generally. I am grateful to the Norwegian Research Council and their VERDIKT program for supporting the RHYME project financially, and to the Norwegian Academy of Music for their positive attitude toward RHYME and this publication. I especially thank Kjetil Solvik, head of academic affairs at the academy, whose gentle guiding hand is everywhere evident in the research process and my role in the project and publication. Thanks also to Anders Eggen and Tore Simonsen for their constructive helping with the publication process. I hasten to thank the working group at the Centre for Music and Health as well – Lars Ole Bonde, Even Ruud, Gro Trondalen, and Tone S. Kvamme – whose cooperation and support was always freely given and utterly appreciated. A special warm thank to Gary Ansdell for his wise counsel during the RHYME experiments and in meetings afterward as I worked on this anthology. I am very grateful to Haug School and Resource Centre, Merete L. Tobiassen and all of the other people there: Next to providing housing and rooms and professional assistance for the experiments, your inspiring co-operation and wonderful mind-set and enthusiasm kept the whole project on track! Thanks to the professionals who contributed to the focus group interview. Your comments were very valuable, and you showed me how much fun deep insight can be! Thanks to Nils Nadeau for his dedicated help with the language and editing – I learned much about research communication through our collaboration, and I always appreciated his punctuality as well. Thanks also to Anna Louise Claughton Lilleaas and Bjørn Kruse for their support and language advise in the final rounds. I also appreciate Natasha Barrett's contribution on the foreword and for reading the articles so well. To all of the authors in this anthology, whether you participated in RHYME or not: your names have been mentioned already but I want to thank you again for your contributions and excellent cooperation with the articles. I also wish to thank all of the reviewers for the critical and constructive responses! I am confident

that, in all, this anthology supplies a broad and synergistic perspective on the potential connections between music, health, technology and design. I also need to acknowledge the research team for RHYME, even as we work to finalize the project. What a creative bunch of people: Birgitta Cappelen, Anders-Petter Andersson and Fredrik Olofsson, who came up with the art project MusicalFieldsForever (which really started it all), as well as Jo Herstad, Harald Holone and Even Ruud!

Lastly, I am so grateful to the participating families in RHYME – the mothers, fathers, sisters and brothers, grandparents, relatives, and personal assistants who spent time with the project. I know that your everyday lives are busy and demanding, and all of us involved in RHYME owe you much gratitude. Personally, your enthusiasm has been a driving force for me, and therefore I wish to end this editor's foreword with the words from one of you, Inga Bostad:

A room with a parental view

The everyday life of a different family cannot be described. It must be experienced. Not that it is too complex or too hard to describe or communicate to those outside, but because it is as unique as every other family. And this reflection expresses a deeper insight as well: to have a child with special needs, a child that is different, is to hold on to something unknown. You do not know how this child will react to her surroundings, how she will enjoy the physical and artistic inputs that are presented to her, because she is as unique as any other child in the world. And her experiences of joy and sorrow, pain and excitement, have a right to be taken seriously.

The RHYME project has this very fundamental perspective: they observe and they see the different child as an autonomous being, with her more or less familiar and more or less unknown behaviour. As a mother of a child that is totally dependent on others to have a good life, you look for every opportunity to share this responsibility: How can we facilitate the everyday life of the whole family? How can we best help one another to be together and share a desired moment? How can we plan for the basic need of respite care? And how can her right to independence come to life in dependent situations?

Looking through the windows of my family's wooden house on an ordinary afternoon would probably contain no surprises – we look like an ordinary family, except for all the specialized equipment. Simultaneously, what is not seen are the complex needs as well as the many opportunities that are present in this very house. After dinner is over, sitting in the wheelchair needs to be replaced by a new activity – my daughter has already been sitting too much during the day, while at the same time the family members have their own agendas – things have to be done, homework has to be completed, dishes have to be washed and emails have to be answered. Everyone has their needs, and everyone has legitimate reasons for believing they are right in trying to fulfil them. Is there any playful furniture to relax in, which at the same time gives you a sensory experience, stimulates your whole body and invites the other family members to join you? The RHYME project has gathered the right questions, and transdisciplinary research is never successful without asking the relevant and complex questions. And the researchers have answered them as well: we have to work across the disciplines, across the dogmatic and conservative division of science and art and health and technology, to fully understand the needs of those who are different from us.

Thanks for this also!

Karette Stensæth,
Oslo, October 24, 2014

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