Music and computers have been intertwined since the computer’s conception in the mid-1940s. Although computer driven music occupies a relatively short period of music history, an entire culture of exploration and experimentation has established itself within this short time. Editor Roger T. Dean’s *The Oxford Handbook of Computer Music* is a dense collection of informative essays that attempts to address the wide range of topics encompassed by the term “Computer Music.” With the length of the book reaching 611 pages, Dean and his wide variety of contributors touch upon improvisation, interactive performance, spatialization, sound synthesis, sonification, music cognition, pedagogy, socio-cultural topics, historical developments, musical gestures, electronic motion sensors, and electronica to name just a few. This lengthily handbook mostly revolves around the era after the 1980s, where the availability of the home desktop computer allowed the average musician to delve into the world of computer music.

The book’s contributors are primarily university professors, originating from all corners of the globe. It appears that Dean chose these contributors with the intent of their interaction and collaboration. The direct partnership between some authors, and the obvious overlap or intertwining of concepts between chapters, suggests this. The handbook is balanced between argumentative and descriptive approaches to its ad-
average music listener, specifically one who indulges in electroacoustic genres, there is abundant information present for the music historian, performer, and composer alike.

Dean’s edited version contains twenty-six articles which he divides into five sections: “Part I: Some Histories of Computer Music and Its Technologies,” “Part II: The Music,” “Part III: Creative and Performance Modes,” “Part IV: Cognition and Computation of Computer Music”, and “Part V: Cultural and Educational Issues.” Part I contains historical accounts of computer music and its development over the past fifty years. Arguments are few and far between as the chapters descriptively trace the history of computer music from CSIRAC, the world’s first computer to produce musical notes, to the first real-time synthesis programs of the early-1990s, to the modern era of electronic domination and consumer affordability.

Paul Doornbusch’s chapter “Early Hardware and Early Ideas in Computer Music: Their Development and Their Current Forms” serves as the most comprehensive and descriptive chapter of this section. He outlines popular primitive hardware and software and how technological developments have evolved to produce the complex and efficient software programs of today. He notes that the history of computer music is not a “linear trajectory or chronology... It consists of a disparate conglomerate of discrete events.”¹ The inclusion of an acronym index at the chapter’s closing was necessary for understanding the wealth of content addressed. I found myself constantly referencing it, because of the large amount of acronyms used to describe computer software, technical institutions, research centers, and digital instruments. The remaining articles within this section written by Douglas Keislar and Peter Manning focus on the broad history of computer music and early sound synthesis respectively. Although these articles could stand on their own, they suffer in this case as they often reiterate much of the information Doornbusch discusses, but in less detail.

The second portion of this handbook, “The Music,” focuses on exactly that: musical applications, performances, and composition techniques pioneered by musicians. This section opens with the University of Guelph’s own James Harley and his examination of theoretical composition and its relation to mathematics and computer technology. Building on the contributions of computer music pioneers Lejaren Hiller, Iannis Xenakis, and Gottfried-Michael Koenig, he ventures into an often ignored practice in digital music: algorithmic composition. Similarly, Roger Dean envisions the future of improvisation in computer music with the computer serving a collaborative role in improvisation with performers, or the computer itself as the sole improvisor. Dean’s article, “Envisaging Improvisation in Future Computer Music,” stands as the most compel-

opportunities in sonic improvisation using computers."² How the computer itself can
become cognitively active in the process of composition is inventively discussed. Its
speculative nature excites the reader about the profound capabilities of computers in
the not too distant future. The separation of these chapters is confusing, because their
concepts so easily overlap. I was also surprised to find no mention of the digital pro-
gram Computer Improvisation. This software combines computer composition and im-
provisation as it contains “probabilities of musical events, [seeding] to random number
generators”³ outputting “alphanumeric scores arranged in sections, parts, and bars,
which are readable by both humans and computers.”⁴ Despite no mention of “Com-
puter Improvisation,” the relationship between algorithmic composition and computer
improvisation is implied by the placement of these articles in their current sequence.

The remainder of Part II branches off into one of two subsets labeled “Sounding
Out,” both of which are confusingly isolated from their respective larger groups despite
the relationship between topics. This first subset primarily encompasses electronic mu-
sic performers and their personal reflections and thoughts on their own works and their
placement within the computer music idiom. Trevor Wishart reflects on his own obser-
vations about computer music, while Tim Perkis explains his electronic improvisation
practice with purely electronic ensembles. Simon Emmerson concludes this subsection
with the least personal article, examining the combination of the acoustic and electronic
worlds. This chapter serves as the most diagram-intensive section, where visual aids
effectively assist the reader in understanding complex concepts concerning the relation-
ship between the human performer and their machine in performance practice.

Part III serves as the longest section, containing nine chapters. This segment prim-
arily explores the computer’s incorporation into performance settings. This section’s
contributors discuss branches of computer music performance, including electronically
interactive dance, the laptop as an instrument, sensor-based musical instruments, com-
puterized vocal manipulation, spatial composition, algorithmic composition, and elec-
tronica.

This section’s length—reaching 188 pages—precludes any sort of in-depth treat-
ment of each individual article, but outstanding texts within this section are those that
explore motion capturing in a performance medium. These include Wayne Siegel’s arti-
cle “Dancing the Music: Interactive Dance and Music,” Garth Paine’s “Gesture and
Morphology in Laptop Music Performance,” and Atau Tanaka’s “Sensor-Based Musical

²Dean, Computer Music, 133.
Instruments and Interactive Music. These authors explore technological abstractions of the natural and unrestrained movements of the human body as the main controller of sound. As Paine states our “relationships to sound are in part physical: musical instruments... require us to blow, pluck, strum, squeeze, stroke, hit, and bow.” Fellow authors Vincs and McCormick agree: “in many ways the computer stands as a time restraining barrier between immediate movements or instantaneous human expression and actual music performance.” Projects discussed aim to bridge the gap between electronic synthesis and the physical expression that is often lacking in the digital realm. These chapters are clearly written and suggest possible future paths for music performance as we gradually move into an entirely digital existence.

Roger Dean’s fourth section, entitled “Cognition and Computation of Computer Music” is interestingly separated from Part III, as many of the musical ideas and topics overlap or relate with each other. The collaborative effort by Geraint A. Wiggins, Marcus T. Pearce, and Daniel Müllensiefen explores computational modeling of composition based abstractly on human behavior. They describe their own creation, IDyOM, a computer program designed to generate tonal music. This formal presentation is effective. Michael Casey’s article, “Soundspotting: A New Kind of Process?,” outlines the concept of Soundspotting, a recently theorized digital compositional method. This technique works by computing “a similarity score between a target audio segment and all the available segments in the source database.” Casey’s presentation stands as the most technologically detailed. Despite this article’s somewhat daunting complexity, its placement near the closing of this handbook lets the reader approach the intricacy with a conceptual foundation in how computers relate to music.

The second “Sounding Out” section includes, as Margaret Schedel points out, “two giants of computer music”: George Lewis and Pauline Oliveros. Lewis’s article presents a general descriptive analysis of interactivity and improvisation. He recognizes our inability as improvisers to avoid following in the footsteps of past innovators and their achievements. Lewis states we could learn as much from studying the “truly creative” as we do from “observing and analyzing simple everyday acts.”

5 Dean, Computer Music, 214.


7 Dean, Computer Music, 421.


9 Dean, Computer Music, 463.
follows Lewis’s article with her personal account of her almost fifty-years acting as “an outsider in the world of computer music.” This article is unique, as it provides an introspective journey into the experiences of an innovator entirely immersed within the strange exploratory outer realms of the profession. The final chapter in this section, written by Freya Bailes and Roger Dean, serves as an interesting call to arms for scientists to explore computer generated sound synthesis as a serious topic for scientific inquiry. It interestingly situates computer music at the forefront of scientific and cultural development, stating that the evolution of such music is far from over and its worth is largely unexplored.

The fifth, final, and most cohesive subsection of this Oxford handbook focuses on cultural and educational issues, which mainly entail, both directly and indirectly, gender issues. This section exposes a great irony contained within the book. Margaret Schedel noted in her own review of *The Oxford Handbook of Computer Music* that of the book’s 611 pages only seventy-one (or twelve percent) of them are written by women. This leaves five women contributing a mere twelve percent of the book out of the thirty-one contributors involved. The aforementioned irony is expressed within Mary Simoni’s article “Towards the Gender Ideal.”

Simoni explores the thoughts and opinions of the general public on gender roles in the technologically musical world through survey-based research. She parallels the developments of feminist movements with advancements in computer music and identifies the male domination of formal control and the lesser-respected informal control often assigned to women. Simoni effectively argues that although women have contributed greatly to the field of computer music, their efforts often go unrecognized. She cites the contributions of composers and electronic music theorists Laurie Spiegel and Joan E. Miller whose names “seldom appear in historical accounts of the period.” The article itself forces the reader to contemplate the overtly male dominated environment that Simoni suggests is supported by the electronic music industry. But the effectiveness of the article lies not in its argument alone, but rather in the direct reflection of her conclusion within this handbook. If Dean’s book serves as a reader’s first encounter with computer music, they will be met with a male-dominated selection of articles containing scarce references to women’s contributions to the field. A brief analysis into this book’s formatting quickly confirms Simoni’s argument that women are largely ignored and unrepresented, and the fight for equality is far from over.

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10 Ibid., 467.


12 Dean, *Computer Music*, 495.
What lacked in this article, however, was a discussion of the demographic of computer music listeners. She outlines it as a male-dominated profession, but ignores mention of a male-dominated audience. Even something as superficial as the sale of mp3 players shows that “men are more likely to have a music player than women, 14 percent versus 9 percent, respectively.”

Simoni’s article is brilliantly followed, however, by Leigh Landy’s “Sound-Based Music 4 All” that investigates this male dominance. The penultimate chapter of the book presents Landy’s suggestion to expose children to computer based music at an early age. He argues that this will not only expand the demographic of electro-acoustic practitioners and listeners alike, but will also encourage more female involvement in the field.

Overall, on a chapter-by-chapter micro analysis, this handbook of computer music presents itself as widely informative and thought-provoking. But it does not lie without its fair share of flaws. Most significantly, although The Oxford Handbook of Computer Music is somewhat appropriately labelled as a “handbook,” encompassing many traits that are entailed within such a phrase (namely its universality in topics), it fails significantly in capturing the essence of one. Editor Roger T. Dean in his opening chapter states his “purpose in editing this book has been to facilitate access to computer music for the listener... to bring together a range of... issues that a practitioner can always benefit from considering.”

And as stated on the Oxford Handbook Series website their goal is to provide “a leading series of essential pocket handbooks that serve as quick reference guides for students, researchers, and qualified professionals alike.”

A handbook is generally defined as a book “capable of being conveniently carried as a ready reference.” Now to criticize this work based on its physical size would be purely superficial. But a handbook must balance simple referencing and easy access with just enough information to provide a general idea that promotes further research. Too much information and the work fails as a quick reference guide; too little, and the work fails to inform the reader. This handbook falls into the former category. Though it was the obvious intention of Oxford to include all applicable topics, the focus of this specific work is often too specific. The wealth of information provided alludes to both this book’s strongest asset and its subsequent short-comings. Essentially the reader is


14 Dean, Computer Music, 7.


required to complete the entirety of the handbook, formulating a concrete foundation of the topic, before it serves as the quick reference guide it claims to be. With a length exceeding 600 pages, the non-musician may be discouraged. This is somewhat forgivable when one considers the topics addressed in the book range from the purely mechanical and technological to the socio-cultural and psychological, and everything that lies in between. But organizing such a wealth of information is far from impossible. Desmond Sergeant notes in his review of *The Oxford Handbook of Music Psychology* that “despite containing 56 chapters that address numerous differing topics, [this handbook] is surprisingly well organized and cohesive.” Although Dean does attempt to contextualize each essay via larger cohesive groups, he fails in imposing order on what presents itself as disarrayed. Therefore, in a macro-analysis of the format of this book, its presentation is rather ineffective.

In closing, I feel *The Oxford Handbook of Computer Music* presents a valuable analysis of the world of computer music since its inception in the mid-1940s. Roger T. Dean and his group of contributors effectively address a diverse and wide range of computer-music-related ideas that capably inform the reader of over a half a century’s worth of development. The contributors write with such intrigue that they provoke in the reader a sense of the need for further research. The book has its fair share of formatting issues, which could serve to hinder readers outside of the electronic music world. In spite of this, so long as the reader avails themselves of the time to tackle such a dense work, this handbook serves as a great introduction to almost any topic concerning computer music since its creation in the mid twentieth century.

**For Further Reading**


