



# Ann Millikan

Boston Modern Orchestra Project  
Gil Rose, conductor  
Jennifer Curtis, violin



In honor of Robert C. Millikan (1957-2012)

		<b>MILLIKAN SYMPHONY</b>	
Gil Rose			
conductor	1	Science	12:48
	2	Animals	13:14
Jennifer Curtis	3	Rowing	6:10
violin	4	Violin	14:41
			46:55



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#### THANK YOU

My heartfelt thanks to Gil Rose and Boston Modern Orchestra Project, and to violinist Jennifer Curtis for being a part of “Millikan Symphony” from the beginning. I am deeply grateful to my collaborators in North Carolina: Andrew Olshan, Jay Levine, Donald Oehler, Elizabeth Collini, Micah Boyd, and Rev. Tammy Lee, and to the UNC Department of Epidemiology, Lineberger Comprehensive Cancer Center, Gillings School of Global Public Health, Chapel Hill Philharmonia, UNC Men’s Crew, and Chapel of the Cross for their support. I am also indebted to Carolina Breast Cancer Study and my fantastic team of scientists: Leila Family, Katie O’Brien, and Lauren McCullough, and to the Millikan family and my partner Brent Michael Davids. Thanks to Kendal Brown and Kitty Stalberg for hosting me during my trips to NC.

#### SUPPORTERS

My deep gratitude to the following individuals for their generous contributions to Millikan Symphony: Candace Bilyk, Liane Curtis, Ann E. Fonfa, Robert Hiland, Barbara Hulka, Dr. Philip H. Kass DVM, Ari Laish, Beverly J. Levine, Matthew McKinnon, The Millikan Family, Mark Pandick, Judy Parsons, Erin Thomas—in memory of Hal and Julia Thomas, The Whitehead Family, and Sara Williams.

*Dr. Robert Millikan (1957-2012), Barbara Sorenson Hulka Distinguished Professor of Cancer Epidemiology.*

A member of the epidemiology faculty at UNC Gillings School of Global Public Health and of UNC Lineberger Comprehensive Cancer Center since 1993, Dr. Millikan's research in cancer epidemiology brought hope for better understanding and treatment of breast cancer.

"Dr. Millikan had a major impact on the field of cancer and molecular epidemiology," said Andy Olshan, PhD, professor and chair of the epidemiology department and UNC Lineberger's associate director of population sciences. "His innovations led the field and created opportunities for countless epidemiology and other public health students. The department has lost not only a great scientist and teacher but a wonderful friend and colleague."

"Dr. Millikan and his colleagues conducted three waves of this country's groundbreaking longitudinal study of breast cancer in African-American and Caucasian women," said Shelley Earp, MD, director of UNC Lineberger. "Through the Carolina Breast Cancer Study (CBCS), he sought to understand the complex reasons for poor breast cancer outcomes in African-American women. His seminal findings, published in 100 papers, have changed the face of breast cancer disparities research."

Dr. Millikan's UNC Breast Cancer SPORE research combined traditional epidemiological measures of disease predisposition with molecular markers aimed at characterizing genetic susceptibility to cancers. He was also part of an international collaboration, called the Genes, Environment and Melanoma Study, to examine causes of malignant melanoma. That work has added to the understanding of molecular causation of the disease, which is increasing in incidence. He served for more than 15 years as a faculty member for the National Breast Cancer Coalition's Project LEAD, teaching breast cancer advocates about the science of breast cancer epidemiology and genomics.

Dr. Millikan earned undergraduate and doctoral degrees (1982, 1984) in veterinary medicine from University of California at Davis and a Master of Public Health (1991) and Doctor of Philosophy (1993) in epidemiology from University of California at Los Angeles. He was a postdoctoral fellow in molecular biology at Harvard Medical School and Dana-Farber Cancer Institute and completed internship in medicine and surgery at the University of Pennsylvania's School of Veterinary Medicine.

Dr. Millikan was director of the integrative health sciences facility core at the UNC Center for Environmental Health and Susceptibility. He held an adjunct professorship in the College of Veterinary Medicine at North Carolina State University. He spent the 2005-2006 academic year at University College Dublin (Ireland) as a Fulbright Scholar. In 2008, the public health school awarded him the Hulka Distinguished Professorship.

## MILLIKAN SYMPHONY

While writing homages has been a tradition among composers for centuries—one thinks of Ravel’s “Tombeau de Couperin”, or Britten’s “Variations on a Theme of Frank Bridge”, or Marin Marais’ “Tombeau pour Monsieur de Sainte Colombe”—none has been so deeply personal, and so closely aligned to the life of the dedicatee, as Ann Millikan’s homage to her brother in “Millikan Symphony”. Each of the four movements of the symphony focuses on one of her brother’s passions—Science, Animals, Rowing, and Violin—and each movement conveys the dedication and commitment that Bob Millikan brought to each of those passions.

Robert Millikan was a brilliant and beloved scientist, a member of the epidemiology faculty at the University of North Carolina-Chapel Hill. His groundbreaking work in breast cancer research focused on the treatment of young African American women who disproportionately die from the disease. He was also a talented violinist, an avid outdoorsman, the faculty advisor for UNC Crew (who founded the Millikan Cup, an annual regatta, in his honor), and had an early career as a veterinarian. When Robert died at the age of 55 on October 7, 2012, Ann felt the best way to honor him was through their shared love of music, with a title, “Millikan Symphony”, that dates back to their childhood, when they planned a collaborative magnum opus and Bob filled notebooks with compositions dictated to him by Ann, along with one jointly composed theme which became the motif for the Violin movement.

The first movement, “Science”, begins dramatically, with a woodwind chorale leading to a sudden burst of timpani and brass, and then a suspenseful passage of strings trading melodic fragments which sets the tone for the rest of the movement. If “Science” seems especially unpredictable, it may be because of Ann’s interpretation of the scientific process which inspired it: as she describes it, “multistage carcinogenesis process at the molecular level, in particular the interaction between oncogenes and tumor suppressor genes.” The bass keeps an ominous pulse below an angular conversation of motivic fragments between trombones, bassoons, and trumpets, while the strings hold the suspense, with prominent contributions from xylophone, glockenspiel, and timpani. The unsettling nature of this movement is no doubt due to the subject matter: the battle between cancerous and non-cancerous cells, and the struggle of a body to heal itself.

The “Animals” movement refers not only to Bob Millikan’s work as a veterinarian, but to his love of nature and the outdoors. A soaring piccolo solo opens this movement, leading to a pastoral scene with occasional French horn calls, used by Beethoven and Brahms and others to convey the serenity of the countryside. A solo flute twitters the song of a Wood Thrush. Ann Millikan describes the “layers of sound” in this movement, which conjures the multi-dimensionality of sounds in nature. Again, there are multiple clues to her brother’s life: since he spent a year in Ireland as a Fulbright scholar, we hear a plaintive Irish-sounding tune; a surprise appearance of the opening phrases from Mendelssohn’s Violin Concerto reminds us of Bob’s train-

ing as a violinist: a colleague at an emergency veterinary hospital heard someone playing this concerto nearby, and it turned out to be Bob with his violin.

“Rowing” is the shortest movement, about half the length of each of the other three, perhaps because it mirrors the rhythms and duration of an actual crew race. We hear the voices of the orchestra’s violinists, violists, cellists, and bassists shouting “5, 4, 3, 2, 1! Attention! Row!” and then a shimmering ostinato pattern in vibraphone and marimba, evoking the repetitive motion of the crew team’s strokes, against hairpin crescendos in the brass and strings like the swell of the tide and lap of water around the boat. Ann had been advised to base this movement on the 2000-meter race by rowers her brother had coached, and she created a tempo map based on stroke rates from that race, averaging them to a metronome marking of quarter note equals 72, so that it’s perfectly timed to the video of the 2013 Millikan Cup race (which you can watch online with this movement accompanying it). “Rowing” is divided into sections: Settle, 500 meters, 1000 meters, 1350 meters, and 1500 meters, at which point the full orchestra sprints forward and accelerates towards the finish line with an electrifying burst of energy.

The final movement, “Violin”, takes the form of a concerto with soloist Jennifer Curtis, who was involved with the project from the beginning. To more fully understand Bob’s approach to the violin, Ann went through his copies of concertos he had played and studied the meticulous notes he had written in the scores. She also found a theme they had written together as children for a projected Millikan’s Symphony, highlighted by a descending ninth, which provides the framework for the entire movement. The descending ninth first appears in the solo violin, with a major third added, and becomes a recurring motif in both violin and orchestra, showing up in various permutations. This interval, just a half-step larger than an octave, projects a sense of restlessness and instability, which is compounded by echoes of Romantic violin concertos and dramatic chromatic passagework emphasizing the brass and percussion. “Violin” brightens in its finale with a spirited dance in 7/4, and with a brilliant pyrotechnical display in the violin, the movement, and the symphony, come to an exuberant close.

One of the most remarkable aspects of “Millikan Symphony” is its spirit of collaboration. For each of its four movements, Ann reached out to specialists and colleagues who knew her brother’s work. Three of Bob’s former doctoral students—Leila Family, Katie O’Brien, and Lauren McCullough—helped her understand the science of breast cancer and how to convey it musically, and other collaborators included Micah Boyd, the head coach of UNC Men’s Crew, and Jay Levine, Professor of Epidemiology and Public Health, College of Veterinary Medicine, NC State University. These bonds not only deepened Ann’s understanding of her brother and his life’s work and diverse interests, but strengthens the fabric of her “Millikan Symphony” with a profound sense of how music can speak to family, community, and the loved ones we have lost.

– Sarah Cahill

Ann Millikan's music has been described as “tonally challenging yet emotionally involving” (Joseph Woodard, LA Times), “packed with propellant polyrhythmic textures” (New Sounds, WNYC), and “characterized by high energy and a quirky inventiveness that defies easy categorization...Her scoring is clean and transparent and her felicities of orchestration are among the most attractive elements in her work.” (Stephen Eddins, All Music).

Millikan composes concert music for orchestra, chamber ensembles and choir, opera, and experimental and interdisciplinary projects involving installation, theatre and dance. Rhythmic vitality is a powerful force in her music, stemming from previous years playing jazz, African and Brazilian music. Her music is expressive and colorful, moving freely between atonal and tonal/modal languages depending upon the overall desired effect. She creates rich orchestral textures that are characterized by layering, rhythmic juxtaposition, and complex counterpoint.

Known for her collaborative projects that connect deeply with community – story, history, and culture are often an impetus behind her work.

Millikan received her MFA in Composition from CalArts where her mentors were Mel Powell, Morton Subotnick, and Stephen L. Mosko, and her BA in Music–Jazz from San Jose State University. Her works have been performed in Europe, South America and throughout the United States by Orchestra Filarmonica di Torino, Orchestra Sinfonica della Provincia di Bari, Emanuele Arciuli, ABSTRAI Ensemble, California EAR Unit, Zeitgeist, No Exit, Mankato Symphony Orchestra, Chapel Hill Philharmonia, Citywinds, New Century Players, Oregon Repertory Singers, Grace Cathedral Men's Choir, and Joan La Barbara, among others.

Ann Millikan is a recipient of the prestigious McKnight Composer Fellowship. She has garnered awards from the City of Saint Paul, MN State Arts Board, California Arts Council, American Music Center, ASCAP, American Composers Forum, Meet The Composer, Argosy Foundation Contemporary Music Fund, Jerome Foundation, Zellerbach Family Fund, Berkeley Civic Arts Program, and Waging Peace Through Singing (Highest Honors). Millikan is a freelance composer based in Saint Paul, MN. Her orchestral and chamber music is on Innova Recordings, and her opera “Swede Hollow” is available from CD Baby.

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## CREDITS

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BMOP recordings session photo:  
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Millikan Cup photo: Ann Millikan  
Photos of Bob Millikan: Brent Millikan  
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