Computer Music
• The tape recorder becomes commercially available around 1950
  – Possible for composers to record sounds, arrange them in any order
• 1950s-1960s advances in technology: possibilities beyond tape recorded sounds
  – ability to compose sound itself
  – computers and synthesizers provided means
Bell Labs, New Jersey
1957

• 1st computer-generated piece of music:
  Newman Guttman - *The Silver Scale* 1957 (17 sec)
  – Created with “Music I” software at Bell Labs, NJ
  – Leads to Music “N” series
Music “N” series

• Max Matthews Music I - Music V (1957-1968)
• Music I
  – software program to generate sounds with a computer
• Music V
  – Modular
  – Simulated oscillators, mixers, amps
  – Streams of numbers were output that represented waveforms
• Forerunner of today’s “soft synths”
Mid-1960s: field of computer music expands

• Centers established at Stanford and Columbia Universities

• IRCAM in Paris
  – Headed by Jean Claude-Risset
    • had worked with Matthews at Bell Labs

*Mutations* 1969 (written with Music V)
FM Synthesis

• John Chowning, Stanford
  – Inspired by Matthews
  – Developed FM synthesis
    • Modulate the sound of one oscillator with another
  – Later licensed by Yamaha Corp (DX7)
  – FM synthesis – ability to transform between very different electronic timbres

*Sabelithe* 1971
Voice Analysis/Re-Synthesis

• Sounds converted into digital signals
  – analyze parameters and re-synthesize the sound
• Analysis of speech used to create a singing computer

  *Bicycle Built For Two* 1961
  *
  *Her Song from Six Fantasies on a Poem by Thomas Campion* 1978 by Paul Lansky
Other Manipulation and Transformation of Recorded Sound

• James Mobberly – processed vocal sounds in interesting and strange ways
  – Csound – descendant of Music I

Music for Vox Inhumana 2000
Interactive Computer Music

- *Dance Mad 2010*, Dan Hosken
  - Live cello processed in realtime by composer
  - Composer captures samples and layers them over the live cello
  - Samples placed under realtime control (motion) of performer