CT Historical Time Line

On this Wiki page the previous class has started a historical timeline of the individuals and CT scanner developments that have shaped the field of CT we have today. To earn bonus points you need to add a new historical individual or scanner development or edit a previous post by adding new material.

Please add rows as necessary to keep the timeline in the order of earliest to latest date. The posting must be referenced to obtain points. Remember to email the instructor and briefly summarize the change you made to the Wiki to obtain points.

1. Add a new historical individual or CT scanner development.
2. Edit a previous post, adding new material or fixing an error.
3. Add an image of the individual or scanner to historical events listed.

<table>
<thead>
<tr>
<th>Date</th>
<th>Historical Event</th>
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<tbody>
<tr>
<td>1903</td>
<td>Johann Radon proved it possible to reconstruct or build up an image of a two- or three-dimensional object from a large number of projections from different locations. The mathematical basis for tomographic imaging was laid down by Radon. <a href="http://www-groups.dcs.st-and.ac.uk/~history/Biographies/Radon.html">http://www-groups.dcs.st-and.ac.uk/~history/Biographies/Radon.html</a></td>
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<tr>
<td>1917</td>
<td>Stratiography: Allesandro Vallebona, pioneering Italian tomographer, came up with idea and implemented Stratiography which was new X-ray technology that helped to lead to computed tomography. In Stratiography the x-ray source and the film detector are fixed to a pendulum so that the x-rays are perpendicular to the pendulum and parallel to each other no matter what way they are oriented. His technology is very similar to tomography but some of his theories about it were incorrect. His intention of this invention was that the plane normal to the pendulum remain in focus no matter what. It was shown, however, that if the pendulum moves in one place than only a line remains in focus, and if the pendulum swings about in a circular fashion centered around a point then only the point around which it circles will remain in focus. Vallebona later fashioned more sophisticated equipment but the ideas used in the first stratiograph led to the development of computed tomography. [<a href="http://books.google.com/books?id=19770Y2QFScC4gpp-PA11jpq-PA11dp-alessandro%20vallebona&amp;source=bl&amp;ots=O3qDZ2Gk0s&amp;sig=PS5Wb7C6y2OZn0v6BjWdwa---XMo1v8oX62tv0nkQ">http://books.google.com/books?id=19770Y2QFScC4gpp-PA11jpq-PA11dp-alessandro%20vallebona&amp;source=bl&amp;ots=O3qDZ2Gk0s&amp;sig=PS5Wb7C6y2OZn0v6BjWdwa---XMo1v8oX62tv0nkQ</a> result=results&amp;resnum=1&amp;ved=0CEwQ6AEwDjY&amp;sq=alessandro%20vallebona&amp;false From the Watching of the Shadows: The Origins of Radiological Tomography. By Steve Webb](<a href="http://books.google.com/books?id=19770Y2QFScC4gpp-PA11jpq-PA11dp-alessandro%20vallebona&amp;source=bl&amp;ots=O3qDZ2Gk0s&amp;sig=PS5Wb7C6y2OZn0v6BjWdwa---XMo1v8oX62tv0nkQ">http://books.google.com/books?id=19770Y2QFScC4gpp-PA11jpq-PA11dp-alessandro%20vallebona&amp;source=bl&amp;ots=O3qDZ2Gk0s&amp;sig=PS5Wb7C6y2OZn0v6BjWdwa---XMo1v8oX62tv0nkQ</a> result=results&amp;resnum=1&amp;ved=0CEwQ6AEwDjY&amp;sq=alessandro%20vallebona&amp;false)</td>
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<td>1931</td>
<td>Stratiography: Allesandro Vallebona, pioneering Italian tomographer, came up with idea and implemented Stratiography which was new X-ray technology that helped to lead to computed tomography. In Stratiography the x-ray source and the film detector are fixed to a pendulum so that the x-rays are perpendicular to the pendulum and parallel to each other no matter what way they are oriented. His technology is very similar to tomography but some of his theories about it were incorrect. His intention of this invention was that the plane normal to the pendulum remain in focus no matter what. It was shown, however, that if the pendulum moves in one place than only a line remains in focus, and if the pendulum swings about in a circular fashion centered around a point then only the point around which it circles will remain in focus. Vallebona later fashioned more sophisticated equipment but the ideas used in the first stratiograph led to the development of computed tomography. [<a href="http://books.google.com/books?id=19770Y2QFScC4gpp-PA11jpq-PA11dp-alessandro%20vallebona&amp;source=bl&amp;ots=O3qDZ2Gk0s&amp;sig=PS5Wb7C6y2OZn0v6BjWdwa---XMo1v8oX62tv0nkQ">http://books.google.com/books?id=19770Y2QFScC4gpp-PA11jpq-PA11dp-alessandro%20vallebona&amp;source=bl&amp;ots=O3qDZ2Gk0s&amp;sig=PS5Wb7C6y2OZn0v6BjWdwa---XMo1v8oX62tv0nkQ</a> result=results&amp;resnum=1&amp;ved=0CEwQ6AEwDjY&amp;sq=alessandro%20vallebona&amp;false From the Watching of the Shadows: The Origins of Radiological Tomography. By Steve Webb](<a href="http://books.google.com/books?id=19770Y2QFScC4gpp-PA11jpq-PA11dp-alessandro%20vallebona&amp;source=bl&amp;ots=O3qDZ2Gk0s&amp;sig=PS5Wb7C6y2OZn0v6BjWdwa---XMo1v8oX62tv0nkQ">http://books.google.com/books?id=19770Y2QFScC4gpp-PA11jpq-PA11dp-alessandro%20vallebona&amp;source=bl&amp;ots=O3qDZ2Gk0s&amp;sig=PS5Wb7C6y2OZn0v6BjWdwa---XMo1v8oX62tv0nkQ</a> result=results&amp;resnum=1&amp;ved=0CEwQ6AEwDjY&amp;sq=alessandro%20vallebona&amp;false)</td>
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<td>1937</td>
<td>Watson developed tomographic technique in which the sections were transverse sections (cross-sections). It was referred to as transverse axial tomography. Euclid Seeram, “Computed Tomography” Physical Principles, Clinical Applications, and Quality Control Third Edition; Copyright 2009 These images were not useful in diagnostic radiology because they lacked enough detail and clarity. Euclid Seeram, “Computed Tomography” Physical Principles, Clinical Applications, and Quality Control Third Edition; Copyright 2009</td>
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<td>1950's</td>
<td>Godfrey N. Hounsfield begins work as a researcher at EMI. He worked in the computer business until 1962, when EMI signed The Beatles. Their massive success, and his good-standing with the company, led him to conduct his own private research, thus inventing the CT Scanner. <a href="http://news.cnet.com/8301-13526_3-9995690-27.html">http://news.cnet.com/8301-13526_3-9995690-27.html</a></td>
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<td>1955</td>
<td>Computers were used to calculate radiation dose distributions in cancer patients, which subsequently led to the use of computers in radiology. Radiology computer applications are now commonplace and fall into 2 categories: imaging and nonimaging applications. Source: Seeram, Euclid. Computed Tomography: Physical Principles, Clinical Applications and Quality Control Third Edition, 2009.</td>
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<td>1956</td>
<td>Ronald Bracewell publishes paper mapping sunspots using a series of one-dimensional images to reconstruct a two-dimensional image using Fourier transform. <a href="http://www.wikiradiography.com/page/CT+History+%26+Development">http://www.wikiradiography.com/page/CT+History+%26+Development</a></td>
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<tr>
<td>1958</td>
<td>William Oldendorf builds a model CT scanner without a computer. <a href="http://www.wikiradiography.com/page/CT+History+%26+Development">http://www.wikiradiography.com/page/CT+History+%26+Development</a></td>
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### 1963
Allan MacLeod Cormack publishes two papers in the journal of applied physics. These papers contained theoretical calculations which were turned into a real application that will help Hounsfield produce the first CT scanner. [http://en.wikipedia.org/wiki/Allan_McLeod_Cormack](http://en.wikipedia.org/wiki/Allan_McLeod_Cormack)

### 1966
David Kohl publishes paper with the transmission images of a subject's thorax. [www.wikiradiography.com/page/CT+History+%26+Development](http://www.wikiradiography.com/page/CT+History+%26+Development)

### 1967
Bracewell reconstructs lunar images without using Fourier transforms. [www.wikiradiography.com/page/CT+History+%26+Development](http://www.wikiradiography.com/page/CT+History+%26+Development)

### 1968
EMI patents Godfrey Hounsfield's method apparatus and the apparatus for scanning the body with X-rays. [www.wikiradiography.com/page/CT+History+%26+Development](http://www.wikiradiography.com/page/CT+History+%26+Development)

### 1970
The first clinical CT scanner was installed at Atkinson-Morley's Hospital

Euclid Seeram, "Computed Tomography" Physical Principles, Clinical Applications, and Quality Control Third Edition; Copyright 2009

The original 1971 prototype took 160 parallel readings through 180 angles, each 1° apart, with each scan taking a little over 5 minutes. The images from these scans took 2.5 hours to be processed by algebraic reconstruction techniques on a large computer. The scanner had a single photomultiplier detector, and operated on the Translate/Rotate principle.

[Photo added by S. Moore](http://www.nndb.com/people/500/000131107/)

### 1971
Dr. James Ambrose joined Hounsfield's early study of an apparatus used to produce X-rays that would pass from all directions through an object to obtain information on the internal structures which could then be represented in 3D. Ambrose was a consultant radiologist at Atkinson-Morley's Hospital. Ambrose and Hounsfield conducted experiments with this apparatus using brain tissue and kidney samples. In these experiments tumors were able to be distinguished from normal brain tissue. Under Ambrose's direction the first clinical prototype CT brain scanner was installed.


Dr. James Ambrose, Blackwell: The Knowledge Retailer. [http://bookshop.blackwell.co.uk/jsp/promo/umh.jsp?action=more&id=14+](http://bookshop.blackwell.co.uk/jsp/promo/umh.jsp?action=more&id=14+)

Interestingly, Dr. James Ambrose recalls that he received a call from an old acquaintance, Dr. Evan Lennon then principal medical officer in Radiology at the Department of Health, asking if he would see a man called “Godfrey Hounsfield” and listen to him. Lennon had found him confusing but was reluctant to dismiss him as a crank (Ambrose later learnt that other eminent radiologists had already dismissed him as a crank). Ambrose recalls that when he and his senior physicist Dr. John Perry met Hounsfield, the conversation was difficult. Hounsfield would only say that the method was fundamentally different from other methods of X-ray imaging, more efficient in photon usage and likely to be more sensitive to small density variations. So Dr. Ambrose wasn’t interested in collaborating at first with Hounsfield.

[http://bjr.birjournals.org/cgi/content/full/79/937/5](http://bjr.birjournals.org/cgi/content/full/79/937/5)

### 1972
A woman with a brain lesion was the first patient to be scanned by the EMI Mark 1 scanner. The noticeable cyst which showed up as a dark spot on her brain, proved the machine’s ability. Dr. Hounsfield was later awarded the McRobert Award.


[http://upload.wikimedia.org/wikipedia/commons/a/ae/Emi1010.jpg](http://upload.wikimedia.org/wikipedia/commons/a/ae/Emi1010.jpg)

A water bag was placed so that it surrounded the woman’s head in order to reduce the range of intensities received by the detector. [http://www.doc.ic.ac.uk/~gzy/pub/hounsfield.pdf](http://www.doc.ic.ac.uk/~gzy/pub/hounsfield.pdf)

The first CT scanner demonstrated in the United States. [www.wikiradiography.com/page/CT+History+%26+Development](http://www.wikiradiography.com/page/CT+History+%26+Development)

### 1973
The first description of Hounsfield's Computerized Transverse Axial Scanning (tomography) technique was published in the British Journal of Radiology.


### 1973

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<tr>
<td>mid 1980s</td>
<td>A high-speed CT scanner was introduced that used electron beam technology, work done by Dr. Douglas Boyd and colleagues during late 1970s. It was invented to image the cardiovascular system without artifacts caused by motion. They called the scanner, at that time, cardiovascular CT scanner.</td>
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</table>
The first spiral CT scanner was a Siemens SOMATOM Plus System. The technology is still widely used today (2010) and triggered a constant succession of CT innovations. [http://www.medical.siemens.com/siemens/zh_CN/ag_ct_FBAs/files/brochures/CT_History_and_Technology.pdf](http://www.medical.siemens.com/siemens/zh_CN/ag_ct_FBAs/files/brochures/CT_History_and_Technology.pdf) |
| 1997 | The National Medal of Technology – awarded by the President of the United States of America to Robert S. Ledley for pioneering contributions to biomedical computing and engineering, including inventing the whole-body CT scanner which revolutionized the practice of radiology and for his role in developing automated chromosome analysis for prenatal diagnosis of birth defects. | [http://pir.georgetown.edu/nbrf/rslbio.html](http://pir.georgetown.edu/nbrf/rslbio.html)  

J. Roggow
1998 Multislice scanners were introduced. They use a series of multiple detectors, increasing the speed at which volume can be scanned in comparison to single slices or dual slice scanners.

2000 The PET/CT scanner, attributed to Dr David Townsend and Dr Nutt was named by TIME Magazine as the medical invention of the year in 2000.
http://en.wikipedia.org/wiki/Positron_emission_tomography#History
PET/CT combines in one single study the functional information of PET with the anatomical information provided by a CT scan. This PET/CT information will enable your physician to pinpoint the exact location of interest and helps in making an accurate diagnosis. The Siemens Biograph PET/CT is used to diagnose and stage cancers, and can help monitor the effectiveness of treatment for each patient. PET/CT can also perform perfusion and viability studies of the heart, as well as advanced neuro imaging for disorders of the brain such as Alzheimer’s disease.

2002 In December 2002, Dr. Allan MacLeod Cormack was granted the Order of Mapugubwe. This is South Africa's highest honor. He received this award for his contribution to the invention of the CT scanner.
http://media.2.web britannica.com/ab-media/18/68918-003-9177BE6F.gif

2004 A 256-slice prototype CT scanner was undergoing clinical tests. Source: Seeram, Euclid Computed Tomography: Physical Principles, Clinical Applications, and Quality Control. 3rd edition 2009
The second 64-slice computed tomography scanner ever produced by Philips Medical Imaging, and the first to reach the United States, has been installed and is now in clinical use at the University of Chicago Hospitals. The scanner, which has four times as many detectors as a typical multi-detector CT scanner, combines unrivaled image quality with remarkable speed. It can produce detailed pictures of any organ in a few seconds and provide sharp, clear, three-dimensional images, including 3-D views of the blood vessels. At that rate, a 64-slice scanner can gather a high-resolution image of a heart, brain or a pair of lungs in about five seconds. A scan of the whole body, (in search of a blood clot, for example, that has become a source of emboli) takes about 30 seconds. The scanners are beginning to have an impact on cancer diagnosis and treatment as well. Nearly 60 percent of CT scans at the University of Chicago Hospitals are done for cancer.

Siemens introduced the SOMATOM. It is a Dual source CT Scanner that features two x-ray tubes and two detectors. It gives much less dose to patients because fast speed of the scan. Dose savings can be up to 50 percent compared to a single source CT.

Computer-assisted detection computed tomography (CAD CT) can reduce perceptual errors by radiologists, enhancing visualization provided by conventional CT and allowing the detection of flat lesions in the colon.

Siemens develops the SOMATOM Definition Flash. This CT scanner set new standards regarding speed and dose reduction. The system required only a fraction of the radiation dose that systems previously required to scan even the tiniest anatomical details faster than ever before. The SOMATOM Definition Flash is a dual-source CT from Siemens, featuring two X-ray tubes that simultaneously revolve around the patient’s body. The fastest scanning speed in CT (i.e., 43 cm/s) and a temporal resolution of 75 ms, enabled complete scans of the entire chest region in just 0.6 seconds. Patients are no longer required to hold their breath during the exam the way they had in the past. At the same time, the SOMATOM Definition Flash operates at an extremely reduced radiation dose. For example, a spiral heart scan can be performed with less than 1 millisievert (mSv), whereas the average effective dose required for this purpose usually ranges from 8 mSv to 40 mSv.