



## Credence Cartridge Radiomics Phantom CT Scans



**Fig. 1:** The 10 cartridges of the CCR radiomics phantom.

## Summary

This collection consists of 17 CT scans of the Credence Cartridge Radiomics (CCR) phantom, which was designed for use in studies of texture feature robustness. The scans were acquired at four medical centers using each center's chest protocol and were taken using GE (7 scans), Philips (5 scans), Siemens (2 scans), and Toshiba (3 scans) scanners. The CCR phantom has 10 cartridges, each with a unique texture, Fig 1. The first four cartridges are 3D printed ABS plastic with 20%, 30%, 40%, and 50% honeycomb fill, and they provide regular, periodic textures. The next three cartridges provide natural textures: sycamore wood, cork, and extra dense cork. A cartridges of shredded rubber particles provides textures similar to those of non-small cell lung cancer. The ninth cartridge is solid, homogenous acrylic and provides a minimal texture control. Finally, the 10<sup>th</sup> cartridge is 3D printed plaster has the highest electron density (400 – 600 HU) and is intended to more similar to bone.

In addition to the DICOM images for the 17 scans, this collection also contains two sets of contours as DICOM RT structure files. The first set provides 8x8x2 cm<sup>3</sup> contours for each cartridge in each scan. The second set provides 16 adjacent 2x2x2 cm<sup>3</sup> contours for each cartridge in each scan. Researchers studying radiomics will be able to evaluate features for robustness across a variety of scanners. Features can be calculated using the researchers own software or third party software such as [IBEX \(imaging biomarker explorer\)](#).

**Related publications:** [http://journals.lww.com/investigativeradiology/Abstract/2015/11000/Measuring\\_Computed\\_Tomography\\_Scanner\\_Variability.3.aspx](http://journals.lww.com/investigativeradiology/Abstract/2015/11000/Measuring_Computed_Tomography_Scanner_Variability.3.aspx)

The following paper was generated on different imaging modalities but the same phantom, this is a related but independent paper with a different set of authors: <http://tinyurl.com/zm7tr7p>

## Acknowledgments

This data set was provided to TCIA by Authors: Mackin, Dennis; Fave, Xenia; Zhang, Lifei; Fried, David; Yang, Jinzhong; Taylor, Brian; Rodriguez-Rivera, Edgardo; Dodge, Cristina; Jones, Aaron Kyle; and Court, Laurence.

### Data Access

## Data Access

Click the **Download** button to save a ".tcia" manifest file to your computer, which you must open with the [NBIA Data Retriever](#) . Click the **Search** button to open our Data Portal, where you can browse the data collection and/or download a subset of its contents.

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Images and Radiation Therapy Structures (DICOM, 1.33 GB)	 
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Click the Versions tab for more info about data releases.

### Detailed Description

## Detailed Description

Collection Statistics	Updated 2017/05/01
Modalities	CT, RTSRUCT
Number of Participants	17
Number of Studies	17
Number of Series	51
Number of Images	2672
Image Size (GB)	1.33

## Supporting Documentation and Metadata

Acquisition parameters for the phantom scans in this Collection:

Scan	Manufacturer	Model	Kernel Type	Slice Thickness (mm)	Pixel (mm)	Spiral Pitch Factor	kVp	Effective mAs	CTD Ivol (mGy)
CC R1-GE1	GE	Discovery CT750 HD	standard helical	2.5	0.49	0.98	120	81	6.19
CC R1-GE2	GE	Discovery CT750 HD	standard axial	2.5	0.70	1.00	120	300	
CC R1-GE3	GE	Discovery CT750 HD	standard helical	2.5	0.78	0.98	120	122	9.3
CC R1-GE4	GE	Discovery ST	standard helical	2.5	0.98	1.35	120	143	16.3
CC R1-GE5	GE	LightSpeed RT	standard helical	2.5	0.98	0.75	120	1102	53.6

CC R1-GE6	GE	LightSpeed RT16	standard	helical	2.5	0.98	0.94	120	367	18.8
CC R1-GE7	GE	LightSpeed VCT	standard	helical	2.5	0.74	0.98	120	82	
CC R1-P1	Philips	Brilliance Big Bore	B	helical	3.0	0.98	0.94	120	320	17.8
CC R1-P2	Philips	Brilliance Big Bore	C	helical	3.0	0.98	0.94	120	369	15.8
CC R1-P3	Philips	Brilliance Big Bore	B	helical	3.0	1.04	0.81	120	320	19.9
CC R1-P4	Philips	Brilliance Big Bore	B	helical	3.0	1.04	0.81	120	369	19.9
CC R1-P5	Philips	Brilliance 64	B	helical	3.0	0.98	0.67	120	372	16.4
CC R1-S1	Siemens	Sensation Open	B3	axial	3.0	0.54	1.00	120	26 - 70	1.5
CC R1-S2	Siemens	SOMATOM Definition Flash	['I70f', '2']	helical	2.0	0.52	0.60	120	17 - 28	
CC R1-T1	Toshiba	Aquilion	FC18	helical	3.0	0.63	1.11	120	135	4.0
CC R1-T2	Toshiba	Aquilion	FC18	helical	3.0	0.63	1.11	120	135	3.8

CC R1- T3	Tosh iba	Aquilion ONE	FC 18	h el ic al	3.0	0.98	0.99	1 20	151	13.5
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### **Citations & Data Usage Policy**

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Users of this data must abide by the [TCIA Data Usage Policy](#) and the [Creative Commons Attribution 3.0 Unported License](#) under which it has been published. Attribution should include references to the following citations:

#### **i Data Citation**

Mackin, Dennis; Fave, Xenia; Zhang, Lifei; Fried, David; Yang, Jinzhong; Taylor, Brian; Rodriguez-Rivera, Edgardo; Dodge, Cristina; Jones, Aaron Kyle; and Court, Laurence. (2017). Data From Credence Cartridge Radiomics Phantom CT Scans. The Cancer Imaging Archive. <http://doi.org/10.7937/K9/TCIA.2017.zuzrml5b>

#### **i TCIA Citation**

Clark K, Vendt B, Smith K, Freymann J, Kirby J, Koppel P, Moore S, Phillips S, Maffitt D, Pringle M, Tarbox L, Prior F. **The Cancer Imaging Archive (TCIA): Maintaining and Operating a Public Information Repository**, Journal of Digital Imaging, Volume 26, Number 6, December, 2013, pp 1045-1057. ([paper](#))

## **Other Publications Using This Data**

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### **Versions**

#### **Version 1 (Current): Updated 2017/07/28**

<b>Data Type</b>	<b>Download all or Query/Filter</b>
Images (1.33 GB)	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="background-color: #007bff; color: white; padding: 5px 10px; border-radius: 3px; display: flex; align-items: center;"> <span style="font-size: 1em; margin-right: 5px;">↓</span> Download         </div> <div style="background-color: #ffc107; color: white; padding: 5px 10px; border-radius: 3px; display: flex; align-items: center;"> <span style="font-size: 1em; margin-right: 5px;">🔍</span> Search         </div> </div> <p>(Requires <a href="#">NBIA Data Retriever</a>.)</p>