Visions and Voices and the USC Libraries have collaborated to create a series of resource guides that allow you to build on your experiences at many Visions and Voices events. Explore the resources listed below and continue your journey of inquiry and discovery!

**Einstein’s Cosmic Messengers**  
**USC LIBRARIES RESOURCE GUIDE**

**EVENT DATE:** October 22, 2010

Music and science coalesce in *Einstein’s Cosmic Messengers*, a stunning multimedia concert created by composer Andrea Centazzo and NASA physicist Michele Vallisneri. Following this magnificent journey through the universe, science writer K.C. Cole will moderate a conversation with Centazzo, Vallisneri and USC cosmology professor Elena Pierpaoli.

**SARA R. TOMPSON** of the **USC LIBRARIES** has selected the following resources to help you learn more about Einstein and the event’s participants. Please visit the online version of this guide at [libguides.usc.edu/cosmic](http://libguides.usc.edu/cosmic) for much more, including videos and links to audio compositions by Centazzo.

### Gravitational Waves Defined

The news site *Science Daily* defines a gravitational wave as: “a fluctuation in the curvature of space-time which propagates as a wave, traveling outward from a moving object or system of objects.” The article goes on to note: “Gravitational radiation is the energy transported by these waves. Important examples of systems which emit gravitational waves are binary star systems, where the two stars in the binary are white dwarfs, neutron stars or black holes. Although gravitational radiation has not yet been directly detected, it has been indirectly shown to exist.”

The *Universe Today* blog noted in 2008: “Gravitational waves are predicted by Einstein’s 1916 General Theory of Relativity, but they are notoriously hard to detect and it’s taken many decades to come close to observing them.”

### Selected Related Books

*Relativity: The Special and the General Theory*  
By Albert Einstein  
*Science & Engineering Library QC173.55.E384513 2006*

*Traveling at the Speed of Thought: Einstein and the Quest for Gravitational Waves*  
By Daniel Kennifick  
*Doheny Memorial Library QC179.K46 2007x*

*Gravitational Waves. Vol. 1, Theory and Experiments*  
By Michele Maggiore  
*Science & Engineering Library QC179.M34 2008*

*Mind over Matter: Conversations with the Cosmos*  
By K.C. Cole  
*Doheny Memorial Library Q162.C584 2003*

*The Hole in the Universe: How Scientists Peered over the Edge of Emptiness and Found Everything*  
By K.C. Cole  
*Leavey Library QC6.C62 2001*
Selected Articles

Note that some of the article citations below include the DOI (Digital Object Identifier) links. DOIs are stable URLs assigned by publishers. They are a good way to get right to an article (if USC subscribes to the journal) or to the abstract (if we do not). All of these citations were found cited in the Inspec Database, to which USC subscribes on the Engineering Village 2 platform. Thanks to Emily Ross, civil engineering major and student assistant for the USC Libraries’ associate deans, for help with research in this section.

Selected Works by Michele Vallisneri

http://dx.doi.org/10.1088/0264-9381/27/8/084009

http://dx.doi.org/10.1011/PhysRevD.81.024004

http://dx.doi.org/10.1103/PhysRevD.78.042002

http://dx.doi.org/10.1011/PhysRevD.81.024004

http://dx.doi.org/10.1103/PhysRevD.77.062004

Selected Works by Elena Pierpaoli

http://dx.doi.org/10.1117/12.857423

http://dx.doi.org/10.1103/PhysRevD.74.103502

http://dx.doi.org/10.110/PhysRevLett.97.021301

http://dx.doi.org/10.1111/j.1365-2966.2006.10408.x

http://dx.doi.org/10.1103/PhysRevLett.95.101302