

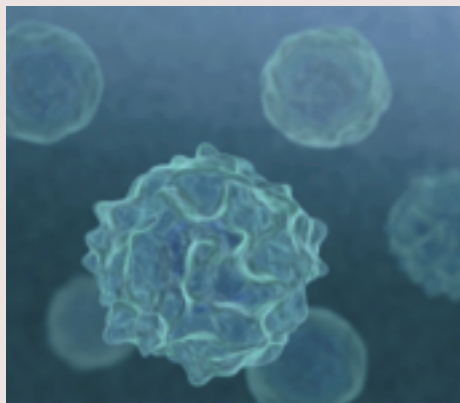
# Visualising Scientific Experiments

*JoVE*, the Journal of Visualized Experiments, was established in October 2006 as the first online journal devoted to video-publication of biological and biomedical research for the purposes of improving the productivity of biomedical research.

**Moshe Pritsker**, co-founder and CEO of *JoVE*, describes its aims and objectives.

Every practising researcher in biology and medicine is familiar with the following paradox: though ground-breaking scientific findings may be published in reputable journals, these publications rarely contain enough information to reproduce experiments described. Although science is supposed to be reproducible, researchers attempting to repeat experiments based on their description scientific journals often fail. Therefore, more than 50% of the time in biomedical research is taken by repetitive attempts to establish and employ experimental techniques and procedures already described in the scientific literature. This has become a never-ending process for scientists as technologies in this fast-growing field undergo significant changes every few years. Currently, the time and resource consuming process of training and re-training techniques and procedures represents a critical 'bottleneck' problem of biomedical research and drug discovery.

To address this widespread problem, the Journal of Visualized Experiments (*JoVE*, [www.jove.com](http://www.jove.com)) was established in October 2006 as the first online journal devoted to video-publication of biological and biomedical research.



Animation from *JoVE* video article to show the conceptual foundation of the experiment.

It publishes video-articles, which are step-by-step video demonstrations of experimental procedures. This novel video-based approach to scientific publishing reflects the reality in scientific laboratories where researchers typically learn new procedures, or protocols, through direct visual demonstration from another researcher. Given the narrow specialization of the current research, it is highly implausible to have an expert consistently available to give detailed on-demand instructions on how to perform a specific experiment. Therefore, the *JoVE*'s approach brings this 'show-me' solution to the new systematic level, making transfer of scientific knowledge fast and efficient.

Examples of the magazine's video-articles include 'Calcium Imaging of Cortical Neurons using Fura-2 AM' (<http://www.jove.com/index/details.stp?ID=1067>) produced in the laboratory of Ricardo Dolmetsch at Stanford University. This article describes one of the most fundamental approaches in neuroscience – measuring calcium flux in cultured brain cells. Derivation of human embryonic stem cells (<http://www.jove.com/index/Details.stp?ID=574>) is described by the Harvard group of Professor Doug Melton, one the leading experts in the stem cell biology today. Another video-article, 'Microfluidic Chips Controlled with Elastomeric Microvalve Arrays' (<http://www.jove.com/index/details.stp?ID=296>), from the Albert Folch's lab at University of Washington, demonstrates the fabrication of a bioengineering device used for controlled mixing of drug compounds. The structure of the video-articles is similar to the traditional scientific articles, including an Abstract, Introduction, Experiment and Discussion. These video-articles are supplemented



Aaron Kolski-Andreaco and Kai-Jae Wang editing a JoVE video article.

by text descriptions of each experimental technique.

The magazine was established by a group of young scientists who came to the idea of research video-publication through their own experience. Moshe Pritsker and Klaus Korak, who worked as post-doctoral researchers at Harvard Medical School and Massachusetts General Hospital in Boston, and a Web programmer Nikita Bernstein, teamed in 2006 to found JoVE, with its first office in Cambridge, Massachusetts, the world centre of the life science industry. Other key members of the team include Aaron Kolski-Andreaco who develops and leads the video-production, and scientific editors Nandita Singh and Mark Shalinsky. Almost all the members of the team hold doctoral degrees in various areas of biomedical sciences. The unique combination of the scientific, web development and video production skills facilitates adjustment of the JoVE's video-publication to the needs of its final users, scientists in academia and industry.

Despite its novel format, JoVE has attained recognition in the scientific community by achieving a number of key milestones. Like all credible scientific journals, JoVE is indexed in PubMed and MEDLINE, the official repositories of

scientific literature maintained by the US government's National Institute of Health (NIH). JoVE has assembled an editorial board of twenty-two distinguished professors, faculty members from leading institutions in US, Europe and Japan. These include David Scadden, the co-director of the Harvard Stem Cell Institute, and John Hopfield, a leading neuroscientist at Princeton. After only two years of operations, JoVE has published twenty-three monthly issues including nearly 300 video articles across all the areas of experimental biology. Most of the articles are produced at laboratories in the leading academic research institutions including Harvard, MIT, Berkeley, Stanford, Yale and others. More than 70,000 unique users, mostly scientists and students, visit the JoVE site every month, and each video-article is viewed about 5,000 – 10,000 times per year. Being initially focused on basic biological research, we have received numerous requests to expand the approach into clinical medicine and psychology.

Most scientists do not have experience in video-production, and therefore cannot generate high quality video representations of their own experiments. Hence, JoVE has developed

a network of videographers across thirty cities in USA, Canada, UK, Germany and Japan. These video-professionals are selected, interviewed and trained by JoVE before they are sent to film in laboratories situated in centers of academic research such as Boston, San Diego, San Francisco, New York, Chicago, Seattle, Toronto, Vancouver, London, Berlin, Tokyo and others. Once film footage has been obtained, it is sent to our headquarters, where all editing is performed. Centralized post-production is made possible by a system of scripting and slating, which enables video editors to put together videos of complex research techniques at low cost. The filming of a typical experiment takes four to five hours, and the end product is a ten to fifteen minutes long video.

The JoVE business model is typical of the scientific publishing industry, including author publication fees, subscriptions from institutional libraries, and advertisement payments from companies and producers of research tools. Being initially focused on its product development and receiving financial support from a group of 'angel' investors in Europe, JoVE aims to achieve profitability within the next two years.

Biomedical research has reached a level of complexity that approaches the complexity of living species under investigation. In stark contrast to the rapid advancement of scientific research, scientific communication still heavily relies on traditional text journals. The format of these journals has remained practically unchanged for the last 200 years and cannot ensure efficient transfer of scientific information. Visualization through online video offers a solution to this problem by providing a clear unambiguous demonstration of scientific work. The JoVE team plans to build a large comprehensive online video-publication that includes a video-article on every possible experimental technique in biological and medical research. They believe that creation of such a resource will tremendously increase productivity of research in academia and biotech industry, accelerating development of new technologies and drug discovery.

**Moshe Pritsker, Ph.D.**  
CEO, co-founder of JoVE  
[www.jove.com](http://www.jove.com)

## MOVING IMAGE GATEWAY

This section features websites selected from the Moving Image Gateway ([www.bufvc.ac.uk/gateway](http://www.bufvc.ac.uk/gateway)). All sites are tested on an iMac OS X 10.3.9 with a 500 MHz processor, with 10Mbps online connection.

**10 DOWNING STREET**

[www.number10.gov.uk/](http://www.number10.gov.uk/)

The site includes basic information on the British government, and features an archive of audio internet broadcasts by the Prime Minister, and video recordings of government commercials, videos to accompany annual reports, Budget statements, press conferences, and Prime Minister's Questions in the House of Commons (transmitted live and then archived back to 2000). The site also offers 360 degree views of individual rooms in 10 Downing Street.

**AH! PODCASTS**

<http://ah.brookes.ac.uk/podcasts/>

A continuing series of audio podcasts relating to aspects of publishing, many of which discuss the impact of new technology on the industry. The recordings are of talks given by guest lecturers at the Oxford International Centre for Publishing Studies, Oxford Brookes University.

**EUROPEAN FILM GATEWAY**

[www.europeanfilmgateway.eu/](http://www.europeanfilmgateway.eu/)

The European Film Gateway is a three-year project which started on 1st September 2008. It will develop an online portal, providing direct access to about 790,000 digital objects including films, photos, posters, drawings, sound material and text documents. Content will be provided mostly by film archives and cinémathèques, which are partners in the project. The collections to be made accessible have been selected to serve as a sample representing the actual digitised content held in the film institutions.

The European Film Gateway will be linked to the *Europeana* portal, which is creating the European digital library, museum and archive, providing integrated access to digital treasures from museums, archives, audio-visual archives and libraries of Europe. By making its archival content available through the common interface of *Europeana*, EFG will contribute to fulfilling one of the major promises of an integrated digital environment: enabling users to search and retrieve different media via a single access point.

**ITUNESU**

<http://tinyurl.com/8q6bqr>

iTunesU offers an extensive and ever-expanding range of video and audio educational material for use in

teaching and learning in higher education. Content mainly originates from the United States and is supplied by universities, museums, cultural institutions and public broadcasting stations. Much of the footage consists of filmed lectures. British universities now supplying programmes include Oxford, Cambridge, University College London and the Open University. Tracks can be downloaded to iPods or iPhones or viewed online.

**LIVING ROOM CANDIDATE**

[www.livingroomcandidate.org/](http://www.livingroomcandidate.org/)

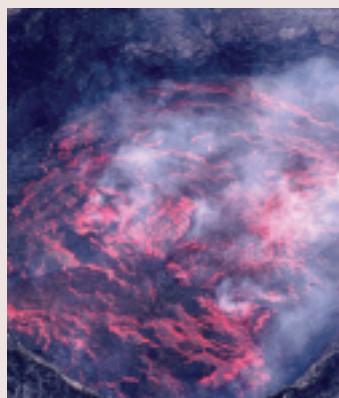
An online exhibition containing 183 television commercials, from every American presidential election from 1952 to 2004. The 'Desktop Candidate' section of the site contains internet-based campaigns from 2004 onwards. The ads can be accessed chronologically or by theme. For each election year there is a selection of commercials, an analysis of each major party's advertising campaign, and a map showing the election results.

The 'Play All' option allows the user to watch each year's commercials in sequence. Uses RealVideo or Windows Media Player (56K, 100K or 300K). There is good supporting information and teaching resources throughout this website, in what is a model package.

**MT EREBUS VOLCANO OBSERVATORY**

<http://erebus.nmt.edu/video.php>

Site dedicated to the Mt Erebus volcano, Ross island, Antarctica. It includes numerous QuickTime movie clips of lava flows, ash eruptions and lava lake eruptions, with background information on the science being conducted at Mt Erebus.



Mt Erebus lava lake.  
(© Dr. Bill McIntosh, 1983)

## ONLINE CATALOGUES

This section features catalogues selected from HERMES ([www.bufvc.ac.uk/hermes](http://www.bufvc.ac.uk/hermes)).

**CLASSROOM VIDEO**

[www.classroomvideo.co.uk/](http://www.classroomvideo.co.uk/)

In addition to in-house productions, Classroom Video seeks to bring customers the very best of educational and documentary programming from the world's leading production companies.



DVDs designed for educational use with the National Curriculum, from primary level upwards. Programmes for further and higher education are arranged into the following subject areas on the website or in separate catalogues: business & management, computing & information technology, construction & built environment, creative arts & design, engineering & electronics, health & social care, hospitality & catering, media studies & communications, performing arts & music, sports & exercised science, travel & tourism. A new subject area covered for the first time in 2009 is child development. Sale

**CRIMSON CATS AUDIO BOOKS**

[www.crimsoncats.co.uk](http://www.crimsoncats.co.uk)

Audio recordings of books which are mostly out of print and often unknown. The collection includes three tapes of interviews with sportsmen and women including Mary Peters, Stirling Moss, Ted Dexter, Tom Finney and Walter Winterbottom (see *Subject News* page 30); travel writing from the 1930s; an account of the Battle of Trafalgar by the surgeon on board HMS Victory; writings six 19th century lady gardeners. Sale.

**D&AD: SHOWREELS**

[www.dandad.org/shop/](http://www.dandad.org/shop/)

DVD showreels of entries for the annual D&AD awards for design and advertising over the last few years. The 2004 and 2002 showreels are sold

together with a printed annual containing articles by leading creatives. Sale.

**DAVID REVIEWS**

[www.davidreviews.com/](http://www.davidreviews.com/)

A website offering free streaming of recent television advertisements using QuickTime, Real or Windows Media Player. It is possible to select favourite ads and keep them in compilations that you can access each time you log in or they can be purchased on DVD. Weekly and monthly compilations of new ads are also available for purchase. Free registration is required for access.

**INSTITUTE OF PHYSICS: VIDEO LOAN SCHEME**

<http://tinyurl.com/cfkxyh>

An online catalogue (available as a Word document and a PDF) of the collection of videos on various aspects of physics and at various levels that are available on free loan to affiliated institutions and members of the Institute of Physics.

**JUMPCUT**

[www.jumpcutuk.com/](http://www.jumpcutuk.com/)

Video and DVD titles for job seekers covering letter writing, compiling CVs, applications, interview skills, assertiveness, etc. Sale.

**MEDIASLEUTH**

[www.mediasleuth.com/navtree/index.php](http://www.mediasleuth.com/navtree/index.php)

An American online mail order service for ordering from one source around 150,000 non-print educational and training resources (in all audio-visual media), selected from the National Information Center for Educational Media (NICEM) database. The programmes come from around 120 different distributors. Since 1958 NICEM has been cataloguing non-print educational materials from over 25,000 production and distribution sources world-wide.

**VIEWTECH**

[www.viewtech.co.uk/](http://www.viewtech.co.uk/)

A collection of films from leading specialist educational producers worldwide, particularly in the USA and Australia. Focuses mainly on primary and secondary education, but with some resources for use in further/higher education and vocational training courses. All curriculum areas are covered and the website has separate PDF files for each subject. Sale.

## ONLINE SUBJECT NEWS

Online Subject News is a round-up of new online material selected from HERMES ([www.bufvc.ac.uk/hermes](http://www.bufvc.ac.uk/hermes)) for its potential value and use in Higher and Further Education.

## ARCHAEOLOGY

**THE IRAQ MUSEUM: THE LOSS OF A NATION'S MEMORY**

In April 2003, American troops entered Baghdad and the fog of war descended over the city. The staff of the National Museum of Iraq, under Director Dr. Donny George, were forced to abandon the Museum temporarily. On their return, they found the Museum, which houses key Mesopotamian collections, badly vandalized and much of its contents damaged or stolen. On 24 May 2008, Dr. George spoke to the audience at The Archaeology Channel International Film and Video Festival, recounting those events, the aftermath and the lessons to be learned. (50 minutes)

**Available free online.**

**Streamed from:**

<http://tinyurl.com/cr9287>

**Requires: WMP / Real.**

**The Archaeology Channel**

## ART

**FRANCIS BACON AT THE BBC**

Complete programmes, excerpts and documents charting Francis Bacon's BBC television and radio appearances, from the early 1960s until shortly before his death in 1992, presented as a collection to coincide with Tate Britain's 2008 retrospective of Bacon's work. The artist discusses his influences, his best-known paintings and his opinions of other artists, while art experts and historians explain the background to his vision. Includes an 18-minute interview recorded for a pilot of a live arts discussion programme that was never broadcast. In this excerpt, Julian Jebb interviews Francis Bacon about his contemporaries in the art world, his working practices and his personal philosophies, such as his belief that true abstract painting is nothing more than 'lyrical, charming and decorative'.

**Available free online.**

**Streamed from:**

[www.bbc.co.uk/archive/bacon/](http://www.bbc.co.uk/archive/bacon/)

**Requires: Flash.**

**BBC Archive**

## BIOLOGY

**SCHOOL MATTERS – ADAM RUTHERFORD ON EVOLUTION AND CREATIONISM**

Dr Adam Rutherford investigates the idea that the teaching of evolution is

being threatened by a rise in creationism amongst religious students. Rutherford speaks to the former Director of Education at the Royal Society, Reverend Professor Michael Reiss to get his views on the subject. (30 minutes)

**Available free online.**

**Stream / Download from:**

[www.teachers.tv/video/29680](http://www.teachers.tv/video/29680)

**Requires: Flash.**

**Teachers' TV**

## BUSINESS STUDIES

**WHAT IS VIDEO ADVERTISING? / WHAT IS THE FUTURE OF VIDEO ADVERTISING**

Two short films about the practicalities of online video in advertising. Kieron Matthews (IAB), David Pugh Jones (Microsoft Advertising), Jez Jowett (Agency.com) and Dean Donaldson (Eyeblander) look at the advantages that online video advertising can have on your brand. The research concentrated on five advertising campaigns from the supermini car sector – Renault Clio, Toyota Aygo, Nissan Micra, Ford Fiesta and Mini – and looked into the effectiveness of online against other media, as well as wider influences like brand ownership, reading reviews, or recommendations from friends. (4 minutes each).

**Available free online.**

**Streamed from:**

<http://tinyurl.com/d3s2a9>

**Requires: Flash.**

**Internet Advertising Bureau**

## INFORMATION TECHNOLOGY

**RANDOMNESS IN COMPUTATIONS, A SENTIMENTAL JOURNEY**

Video recording of the New Fellows Seminar given at the Royal Society by Professor Michael Rabin on 10 July 2008. When dealing with computations intended to produce exact results, the injection of randomness into the process seems to be an absurd idea. And yet, over the past thirty years randomized algorithms have emerged as a powerful tool for the solution of many important computational problems. Examples include testing large integers for primality, finding a nearest pair within a set of points, unbreakable encryptions, and implementing secure auctions. (24 minutes)

**Available free online.**

**Streamed from:**

<http://tinyurl.com/5mavfr>

**Requires: WMP / Real.**

**Royal Society**

## MATHEMATICS

**SYMMETRY IN THREE DIMENSIONS**

A twenty-hour course produced by the Open University and made available free online (i.e. does not lead to a qualification). It uses the geometric concept of symmetry to introduce some of the basic ideas of group theory, including group tables, and the four properties, or axioms, that define a group. Presented through a series of pdf documents. However, Section 5 features video segments taken from the OU course M208. This section extends ideas of symmetry into three dimensions and considers, in particular, the regular (Platonic) solids. The video is in 2 sections (Part 1 is 14 minutes; Part 2 is 10 minutes) and is streamed in high resolution or is downloadable in low resolution.

**Available free online.**

**Stream / Download from:**

<http://tinyurl.com/dfzqur>

**Requires: Flash / QuickTime.**

**OpenLearn, The Open University**

## MEDIA STUDIES

**THE REVOLUTION WILL NOT BE TELEvised**

An intimate profile of the charismatic and unconventional Venezuelan President Hugo Chavez, the coup attempt against him in April 2002, and his dramatic return to power some forty-eight hours later. (75 minutes)



Hugo Chavez  
(© Victor Soares / Agência Brasil – ABr)

**Available free online.**

**Streamed from:**

<http://chime.tv/#doc/tmv>

**Requires: Flash.**

**Chime.tv**

## PHYSICS

**ESSENTIAL HIGHLIGHTS OF QUANTUM-MECHANICAL CONCEPTS IN CHEMICAL-PHYSICS**

Michael Kasha explains the seven essential highlights of quantum-mechanical concepts in chemical-physics. Science video lecture recorded in 2004 at Florida State University, USA.

**Available free online.**

**Streamed from:**

<http://vega.org.uk/video/programme/208>

**Requires: Real.**

**Vega Science Trust**

## POLITICS AND GOVERNMENT

**SCRUTINY UNCOVERED**

Offers an introduction to the work of Select Committees, the cross-party bodies responsible for carrying out Parliament's key role – to hold the Government of the day to account. MPs, peers, parliamentary officials and witnesses describe how the committee system operates and its impact on Ministers, politicians generally – and those who are invited to have their say. (15 minutes)

**Available free online.**

**Streamed from:**

<http://tinyurl.com/5ml4kd>

**Requires: Flash.**

**Parliament Live**

## TECHNOLOGY

**FUTURE RADIO**

Audio recording of a public discussion on the future of radio, held at the Royal Society for the Encouragements of Arts, Manufactures & Commerce (RSA) on 10 March 2008. Future radio offers radical new ways of engagement. The opportunities offered by high speed connectivity between portable handheld devices, the wide take up of wi-fi internet broadband, the nascent vitality of social networking sites and the inevitable process of human viral networking will increasingly define the future radio landscape. Future radio will be a multi-media, downloadable, time-switchable, podcastable, portable, interactive, international and consumer-led process.

**Available free online.**

**Streamed from:**

[www.thersa.org/events/detail.asp?EventID=2484](http://www.thersa.org/events/detail.asp?EventID=2484)

**EventID=2484**

**Requires: WMP / Real.**

**RSA**