

## CTAN-432 The World of Visual Effects

Spring Semester 2022 Syllabus

Note: Check back for updates.

Thurs 4:30PM – 7:20PM

SCB 104

Units: 2

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Office Hours: Wed 7:45am to 9:45am.

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This course will explore the artistry and traditions of cinematic visual effects (VFX) with a particular emphasis on the indispensable nature of VFX in past, present, and future storytelling. We will examine the creative VFX problem-solving process that continues to be a vital part of cinema. From the earliest motion pictures of magician Georges Méliès (who helped introduce storytelling to movies), through the “trick shot” artists of early Hollywood, to the modern “wizards” hailed for conjuring the visions of the modern blockbuster. Our class will view specific shots, scenes and entire films, and then discuss their technical and dramatic achievements.

After viewing film clips in class, students will be asked to present their assumptions (and guesses) as to how the VFX was accomplished and how effective (or not) this contribution was to the film. From this beginning, students will then discover how the shots/scenes were created. In addition, we will discuss the reasons why various techniques were employed to achieve the final result. Each week, students will be assigned reading and viewing homework followed by a discussion in class.

Visual effects are forever tied to the mystery of film and its enduring power to beguile and enchant. Class discussions will culminate in a final exam in which students will be assigned specific films to analyze. Exams will cover technical and dramatic content with a focus on both how visual effects were accomplished and how filmmakers leveraged VFX to tell new stories. Upon the conclusion of this course, each student will have a basic understanding of the mechanics of VFX and its enduring contributions to storytelling.

Please consult the class schedule below, for specific information. Some classes will include distinguished professionals from the entertainment industry, who will share their working experiences. Some content may be omitted or condensed depending on time constraints. The facts and information students need to successfully pass mid-term and final exams will be fully discussed in class.

Your Final Grade is Based On:

Enthusiastic Attendance  
Reading and Viewing of Assignments  
Dedicated and Heartfelt Discussion and Participation in Class/ Artfully Crafted  
and Wonderfully Perceptive Written Work.  
A Sense of Humor.

As percentages:

Class Participation –15%

Homework – 35%

Mid-term – 25%

Final Exam – 25%

Missing homework or assigned projects will not be excused without documented medical or personal emergencies. A late assignment may not be accepted.

The School of Cinematic Arts curriculum relies heavily on in-class participation and interaction between faculty and students. Many of our courses are taught in a collaborative workshop environment and our theoretical lectures are driven through in-depth classroom discussion and analysis. We hold collaboration and constructive criticism as foundational to all of our learning environments and essential to the methodologies of our instruction. Student attendance is not only fundamental, but mandatory for the structure and success of our program for both the individual student and the educational experiences of other students within our community.

There are no unexcused absences - you need to document explanations of absences for which you want to be excused. You will receive a reduction of one-third letter grade for each unexcused absence.

Tardiness will not be tolerated, as there is simply too much that needs to be accomplished. There will be one “official” warning for tardiness, and then we will lower grades by one-third letter grade each occurrence.

Course Outline:

**Jan. 13, Class – 1,** (Zoom class) VFX Pioneers, Introduction of VFX Techniques. Machine Age technology that would power the cinematic art form for nearly a century.

- Professor’s background as film historian and career highlights in VFX.
- Genesis: Early methods and creators of cinematic illusions.
- Illusionist, Georges Méliès
- Variable frame rates, Glass Shots, Hanging Miniatures and split screens.

Visual Materials to Cover in Class:

1. Those Awful Hats (1909, directed by D.W. Griffith).

2. Safety Last (1923, directed by Sam Taylor), "Trick Danger" clock shot.
3. Modern Times (1936, directed by Charlie Chaplin), Glass shots.
4. Ben Hur (1927, directed by Fred Nieblo), Hanging Miniatures.
5. City Lights (1931), Hanging Miniatures, Open-Air Stage and Painted Backings.

Homework: Watch the film, Hugo (2011, directed by Martin Scorsese). Read: Photoplay April 1926 p.28 "How They Did It" by Frank Williams and answer the following questions in a short paragraph due next class:

<https://archive.org/details/photo29chic/page/n453>

1. What is the title and release date for the first film to use "The Williams' Process".
2. What was Frank Williams like on set?

**Lab: In class: see the Bell & Howell 2709 Camera – touch 35mm film.**

**Jan. 20, Class – 2, (Zoom Class) Continue Introduction of VFX Techniques and Shot Design.**

Visual materials to cover in class:

1. Sunrise (1927, directed by FW Murnau) - Traveling matte methods in early black and white movies – The Williams' process.
2. Metropolis (1927, directed by Fritz Lang) - Eugen Schüfftan use of the cut-out mirror technique.
3. The Dawn Patrol (1930, directed by Howard Hawks) – Dunning shots.
4. The Lady Killer (1933, Roy Del Ruth) – James Cagney comedy on the rear projection screen.
5. Tarzan Finds a Son (1939, directed by Richard Thorpe) – rear projection at MGM, Africa created on a sound stage in Culver City.
6. Too Hot To Handle (1938, directed by Jack Conway)- actors fly airplanes on a sound stage.
7. The Wizard of Oz (1939, directed by Victor Fleming), making a tornado in miniature.
8. It's a Mad Mad Mad Mad World (1963, directed by Stanley Kramer) – Rear Projection in color, less successful.
9. Rogue One: A Star Wars Story (2016, directed by Gareth Edwards) and Solo (2018, directed by Ron Howard) on set projection techniques make a comeback.
10. 2001: A Space Odyssey (1968, directed by Stanley Kubrick) and Superman the Movie (1978, directed by Richard Donner) – a bigger and brighter screen using Front Projection.
11. The Thief of Baghdad (1940, directed by Ludwig Berger, Michael Powell and Tim Whelan) – Blue Screen traveling matte technique is developed.
12. Old techniques rediscovered with new technology, Rogue One: A Star Wars Story (2016 directed by Gareth Edwards) and Solo: A Star Wars Story (2018, directed by Ron Howard).
13. Examples of Blue and Green screen process changing to digital.

Lecture, Hugo (2011, directed by Martin Scorsese) – VFX shot design development and shot improvement.

Quiz: Clip from The Wizard of Oz (1939, directed by Victor Fleming), students turn in paper at end of class.

**Jan. 27, Class – 3, (At USC) Lecture.**

- Review “Wizard of Oz”, discuss quiz from last Class.
- Review first examples of an Academy Award given for visual effects, class discussion on the VFX Oscar nominees for 1939.

Visual materials to cover in Class:

1. Clips from 1939 Oscar nominees; The Rains Came (directed by Clarence Brown), Gone with the Wind (directed by Victor Fleming), Only Angels Have Wings (directed by Howard Hawks), The Private Lives of Elizabeth & Essex (directed by Michael Curtiz), Topper Takes a Trip (directed by Norman Z. McCloud), Union Pacific (directed by Cecil B. DeMille), The Wizard of Oz (directed by Victor Fleming).
2. San Andreas (2015, directed by Brad Peyton) – water, out of control. Compare high-speed photography of water from “The Rains Came” versus CGI particle systems.

**Lab: Analysis, did the work in each Oscar nominated film successfully advance the film’s story? Were the illusions effective? What worked about the VFX sequences. What didn’t work? How could the VFX have been more effective?**

HOMEWORK: Research the career of stop motion animator Ray Harryhausen for Class-4 class.

**Feb. 3, Class – 4, Here Be Monsters – mechanical, puppets, stop motion and CGI. VFX becomes digital and what is the Uncanny Valley.**

Visual Materials to Cover:

1. Die Nibelungen (1924, directed by Fritz Lang) – onset mechanical dragon.
2. Them (1954, directed by Gordon Douglas) – giant ants that walk by hydraulics.
3. King Kong (1933, Merian C. Cooper)– stop motion animation by visual effects creator Willis H. O’Brien.
4. Ray Harryhausen, montage of his career.
5. Mighty Joe Young (1949, directed by Ernest B. Schoedsack) – Ray Harryhausen learns his craft.
6. Jason and the Argonauts (1963, directed by Don Chaffey) – Talos comes to life through the process of Dynamation.
7. Golden Voyage of Sinbad (1973, directed by Gordon Hessler) – the six-armed statue of Kali.

8. Jurassic Park (1993, directed by Steven Spielberg) – mechanical and CGI dinosaurs. The transition from stop motion to CGI using the Dinosaur Input Device (DID).
9. Lord of the Rings (2001, directed by Peter Jackson), Balrogs fire creature in CGI.
10. Star Wars Episode I (1999, directed by George Lucas), VFX becomes digital.
11. The Polar Express (2004, directed by Robert Zemeckis), motion captured humans.
12. The Curious Case of Benjamin Button (2008, directed by David Fincher) crossing the uncanny valley.

**Homework: Students choose a VFX shot from early cinema to the 1950's for discussion in class.**

Be prepared to answer the following questions:

1. How was the shot done – what techniques were used?
2. What does the shot do to advance the narrative of the story?
3. Why is the shot convincing as an illusion - or if it is not, what would have made it better?

Professor will present an example from The Beast From 20,000 Fathoms (1953, directed by Eugene Lourie).

**Feb. 10, Class – 5, practical onset special effects.**

- The hydraulic car flipper.
- Special Effects that defy gravity.
- Students present homework assignments in class.

Visual Materials to Cover:

1. The Royal Wedding (1951, directed by Stanley Donen).
2. The Amazing Spider-man (2012, directed by Marc Webb)
3. 2001: A Space Odyssey (1968, directed by Stanley Kubrick)
4. Apollo 13 (1995, directed by Ron Howard).

**Lab: Students present homework assignment of VFX shots from early cinema to 1950.**

Homework: Watch, the film Citizen Kane (1941, directed by Orson Welles).

**Feb. 17, Class – 6, visual effects created in the studio.**

- Researching how traditional visual effect secrets were achieved.
- The split screen and traveling split screen visual effect.
- Linwood Dunn, Visual Effects Pioneer at RKO Studios and his studio Film Effects of Hollywood.
- Development of Optical Printer effects.
- Special effects, artificial snow in cinema, origins and contemporary usage.
- Students finish presenting homework assignments in class.

Visual Materials to Cover:

1. The Circus (1927, directed by Charlie Chaplin) the tramp meets a lion with split screen.
2. Citizen Kane, (1941, directed by Orson Wells) new ways to tell stories with the optical printer.
3. Bringing Up Baby, (1938, directed by Howard Hawks) the split screen “travels”.
4. West Side Story (1961, directed by Robert Wise & Jerome Robbins) making optical transitions.
5. The Shop Around the Corner (1940, directed by Ernst Lubitsch) down feathers for snow effects.
6. It’s a Wonderful Life (1946, directed by Frank Capra) let it snow with fire fighting foam.

**Homework: Watch, The Curious Case of Benjamin Button (2008, directed by David Fincher)**

**Feb. 24, Class - 7 Discussion of Mid-term Exam.**

Creating performances with VFX – Actors on split screen and CGI humans and subsurface scattering. The Uncanny Valley.

Visual Materials to Cover:

1. Phantom of the Opera (1925, directed by Rupert Julian) Lon Chaney’s make up.
2. The Prisoner of Zenda (1937, directed by John Cromwell & WS Van Dyke) split screen, the same actor plays two parts.
- 3 The Parent Trap (1961, directed by David Swift) identical twins created with VFX.
4. The Social Network (2010, directed by David Fincher) Winklevoss twins.
5. Gravity (2013, directed by Alfonso Cuarón) CGI astronauts in Earth orbit.
6. Lord of the Rings: The Two Towers (2002, directed by Peter Jackson) Gollum.
7. Curious Case of Benjamin Button (2008, directed by David Fincher) a full CGI head.
8. Rogue One: A Star Wars Story (2016, directed by Gareth Edwards) a deceased actor returns in CGI.
9. Tron: Legacy (2010, directed by Joseph Kosinski) less successful, why?
10. Blade Runner 2049 (2017, Denis Villeneuve) Sean Young.
11. Planet of the Apes (1968, Franklin J. Schaffner) prosthetic make-up by John Chambers.
12. War for the Planet of the Apes (2017, directed by Matt Reeves) and Dawn of the Planet of the Apes (2014, directed by Matt Reeves) Andy Serkis, pioneer of motion capture acting.
13. Avatar (2009, directed by James Cameron) the alien/human sterilized Na’vi.

14. The Hobbit: The Desolation of Smaug (2013, directed by Peter Jackson) Smaug comes to life.
15. Cats (2019, directed by Tom Hooper) the uncanny effect in full force.

**Mar. 3, Class – 8, The Invisible Art. A Lecture on Matte Painting Artists: Albert Whitlock, Peter Ellenshaw and Mathew Yuricich.**

Visual materials to cover in class:

1. Documentary on matte painter, Peter Ellenshaw.
2. Darby O’Gill and the Little People (1959, directed by Robert Stevenson) Mixed scale VFX.
3. Twenty Thousand Leagues Under the Sea (1954, directed by Richard Fleischer) Undersea boat miniature.
4. Al Whitlock matte painting montage
5. Zodiac (2007, directed by David Fincher) San Francisco waterfront as CGI environment.
6. CCBB – CGI train station and backwards running clock.

**Lab: Matte painting on display.**

**Mar. 10, Class – 9, Class will take Mid-Term Exam.**

- Lecture on War of the Worlds (1953, directed by Byron Haskin) verses War of the Worlds (2005, directed by Steven Spielberg).
- VFX in the vocabulary of film, past and present.
- How VFX shots are edited in a dramatic sequence.

Visual materials to cover in class:

1. Miniatures and environments for the original War of the Worlds - “WOTW” film
2. Design process for remake “WOTW” film
3. Sequence from Raiders of the Lost Ark (1981, directed by Steven Spielberg) vs. Indiana Jones and the Kingdom of the Crystal Skull (2008, directed by Steven Spielberg).

**Mar. 17, No Class – SPRING BREAK**

**Mar. 24, Class – 10 Guest Lecture- A prominent Visual Effects Producer – discussions on large-scale VFX productions.**

Visual materials to cover in class:

Depending on guest speaker

Homework: Ask students to bring example of a VFX shot created in a film from 1950 to 1990 for discussion in class next class.

**Mar. 31, Class – 11, Guest Lecture - Prominent Visual Effects Supervisor**

- Discussion on large-scale VFX productions.
- Visual materials to cover in class: Depending on Guest Speaker

Homework: Ask students to bring example of a VFX shot created from 1950 to 2022 for discussion in next class.

**Apr. 7, Class – 12, Contemporary CGI Techniques in Visual Effects**

Visual materials to cover:

1. The Matrix (1994, directed by Wachowski's) The bullet time effect, past and future iterations.
2. A brief history of computers in VFX.
3. Global illumination techniques.
4. Motion Capture techniques.

**Lab: Students present homework assignment of VFX shots from 1950 to 2022**

**Apr. 14, Class – 13, Aviation VFX in Cinema – Real Aircraft, Miniature and CGI.**

Visual materials to cover:

1. The Dawn Patrol (1938, Edmund Goulding) Actors and Dunning shots.
2. Chain Lightning (1950, Stuart Heisler) Miniatures 1950 style at Warner Bros.
3. The Right Stuff (1983, directed by Philip Kaufman) Miniatures on wires photographed outdoors.
4. The Aviator (2004, directed by Martin Scorsese) Radio controlled, large scale miniatures that fly – end of an era.
5. Red Tails (2012, directed by Anthony Hemingway) and Flight (2012, directed by Robert Zemeckis) CGI aircraft.

**Lab: Continue discussion of student homework assignment VFX/1950 to 2022**

**Apr. 21, Class 14 – VFX in Outer Space and The Future of Cinema.**

Visual materials to cover:

1. Woman in the Moon (1929, directed by Fritz Lang) Spacecraft Miniatures.
2. Things to Come (1936, directed by William Cameron Menzies) Hanging Miniatures establish futuristic cities of tomorrow.
3. Forbidden Planet (1956, directed by Fred M. Wilcox) Outer space created on a soundstage.
4. Star Wars (1977, directed by George Lucas) Motion Control Camera technologies.
5. Gravity (2013, directed by Alfonso Cuaron) CGI animation will redefine how some live action films will be made in the future?
6. Interstellar (2014, directed by Christopher Nolan) Re-confirming traditional VFX techniques in the digital age?
7. Lion King (2019, directed by Jon Favreau) Virtual Production Techniques.

**Apr. 28, Class 15 – Final Test Prep and The Future of Cinema.**

**Study Days are: April 30 to May 3.**  
**Final Test Date: May 5, Thursday 4:30PM TO 6:30PM**

Suggested Reading:

*VES Handbook of Visual Effects*, Visual Effects Society - Focal Press, 2010 Edited by Jeffrey A. Okun, Susan Zwerman. I recommend you purchase at [www.amazon.com](http://www.amazon.com), as they seem to have the best price.

*The Parade's Gone By*  
by Kevin Brownlow University of California Press ISBN-10: 0520030680

*Special Effects – The History and Technique*  
Richard Rickitt Aurum Press, 2006

*An Animated Life – Ray Harryhausen* ISBN 10: 0712349197  
Melies: Magie et cinema – Malthete & Mannoni (editors)  
ISBN 10: 2879005981

## **Statement on Academic Conduct and Support Systems**

### **Academic Conduct:**

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

### **Support Systems:**

Counseling and Mental Health - (213) 740-9355 – 24/7 on call  
[studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)  
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

Student Health Leave Coordinator – 213-821-4710  
Located in the USC Support and Advocacy office, the Health Leave Coordinator processes requests for health leaves of absence and advocates for students taking such leaves when needed.  
<https://policy.usc.edu/student-health-leave-absence/>

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call  
[suicidepreventionlifeline.org](http://suicidepreventionlifeline.org)

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention and Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call

[studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298  
[equity.usc.edu](http://equity.usc.edu), [titleix.usc.edu](http://titleix.usc.edu)

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298  
[usc-advocate.symplicity.com/care\\_report](http://usc-advocate.symplicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776  
[dsp.usc.edu](http://dsp.usc.edu)

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support & Intervention - (213) 821-4710  
[campussupport.usc.edu](http://campussupport.usc.edu)

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101  
[diversity.usc.edu](http://diversity.usc.edu)

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 –  
24/7 on call  
dps.usc.edu

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)  
ombuds.usc.edu

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

**PLEASE NOTE:**

**FOOD AND DRINKS (OTHER THAN WATER) ARE NOT PERMITTED IN ANY INSTRUCTIONAL SPACE IN THE SCHOOL OF CINEMATIC ARTS COMPLEX.**