Freie Universität Berlin

embattled heavens

the militarization of space in science, fiction, and politics

Freie Universität Berlin
10–12 April 2014

contents

2 Agenda

3 Program

5 Abstracts

5 Colleen Anderson
The Militarization of Outer Space in East and West German Satirical Cartoons, 1957–1989

5 Jordan Bimm
Simulating Mars in the 1950s and the Military Origins of Astrobiology

6 Paul E. Ceruzzi
The Global Positioning System (GPS). Military Origins, Civilian Application, and the Culture of Precise Positioning

7 Oliver Dunnett
C. S. Lewis and the Moral Threat of Space Exploration

7 Greg Eghigian
Flying Saucers, America, and the Specter of War in Postwar Germany, 1946–1960

8 Anthony W. Enns
Satellites and Psychics. The Militarization of Outer and Inner Space

8 Danilo Flores
Envisioning Infiltration. Epistemic Border Disputes of Militarized Astroculture

9 Paweł Frelik
War Play. Space Combat and Galactic Conquests in Arcade and Computer Games

9 Christopher Gainor
The Nuclear Roots of ICBMs

10 Alexander C.T. Geppert, Daniel Brandau and Tilmann Siebeneichner
Heavenly Utopias and Ultimate Battlefields. The Dark Side of Global Astroculture

10 Jörg Hartmann
"Weltraumschiff I startet." The Dual-Use of a Spaceflight-Science-Fiction-Film between Fact and Fiction, V-2 and Sputnik

11 Matthias Hurst
"Raumpatrouille – Die phantastischen Abenteuer des Raumschiffs Orion." Defending Earth in a German Spaceship

12 Patrick Kilian
Darwin vs. Cyborg. Cold War's Struggle for Evolutionary Fitness in Space

12 Cathleen Lewis
Space Spies in the Open. Military Space Stations and Heroic Cosmonauts after the Moon Race, 1971–1975

13 Regina Peldszus
Architecture of Command. Dual-Use Legacy in Mission Control Centers of Civilian Space Operations

13 Alex Roland
The Cold War in Space

14 Diethard Sawicki
Heating Up the Ionosphere and Owning the Weather?
High Power Auroral Stimulation in Defense Scenarios and Conspiracy Theories

14 Isabell Schrickel
The Geopolitics of Space Mirrors

15 Michael Sheehan
Star Wars – Mars against Venus. Strategy, Science Fiction, and Contrasting Visions of Space Security

15 Simon Spiegel
Utopian Soldiers. Robert Heinlein's "Starship Troopers" as a Utopian Novel

16 Dierk Spreen
Global Security and Spatial Revolution

16 Philipp Theisohn
The Suits of Invasion. Extra-Terrestrial Warfare and the 'Clothing' of the Body Politic in Twentieth-Century Fiction

17 Patryk Wasiak
Visual Imagery and the Public Life of Anti-Satellite Weapon Systems

18 Biographies

24 Participants

28 Logistics

For much of the twentieth century, outer space has been envisioned as not only a site of heavenly utopias, but also the ultimate battlefield. Science fact and science fiction celebrated visions of progress and renewal. Astrofuturists imagined a future in which the wonders of space exploration would unite humankind and eliminate violent conflict worldwide. Nonetheless, many of the projects and preoccupations central to Western space thought, such as the efforts to establish a military base on the moon, are testaments to the darker and more violent side of astroculture. Defense interests have historically been driving factors in the development of space technologies. Military and civilian aspects have, however, often been dealt with separately in debates about humanity's widely anticipated future in the stars.

Concentrating on weapons, warfare and violence, this conference explores the military dimensions of astroculture in the period from 1942 to 1990. While space history tends to distinguish between military and civilian aspects, this conference examines the ways in which both have been linked in the legitimization and popularization of spaceflight. By highlighting the militarization of extraterrestrial frontiers and conquest in politics and popular culture alike, 'Embattled Heavens' addresses the complex processes that oscillate between peaceful and aggressive characteristics of human endeavors in outer space. While the Space Age is usually associated with Cold War history, this conference complicates established narratives by integrating Western European and global perspectives. Examining astropolitics, technoscientific practices and science fiction, our goal is to reconceptualize the history of outer space with a view towards its military dimensions.

The organizers would like to express their gratitude to Katherine Boyce-Jacino, Jana Bruggmann, Gilda Langkau, Tom Reichard, Katja Rippert, Gösta Röver, Stephan Töpper and, above all, the Deutsche Forschungsgemeinschaft.

Alexander C.T. Geppert, Daniel Brandau and Tilmann Siebeneichner

thursday, 10 april 2014

10:00 **Welcome and Introduction**
Alexander C.T. Geppert, Daniel Brandau, Tilmann Siebeneichner (Berlin):
Heavenly Utopias and Ultimate Battlefields. The Dark Side of Global Astroculture

10:30 **Feature Presentation I:**
Alex Roland (Durham):
The Cold War in Space

11:45 **Panel I: Angst**
Chair: Markus Pöhlmann (Potsdam)
Chris Gainor (Sidney, CA):
The Nuclear Roots of ICBMs
Greg Eghigian (Philadelphia):
Flying Saucers, America, and the Specter of War in Postwar Germany, 1946–1960

13:00 LUNCH

14:00 **Panel II: Territories**
Chair: Katie Boyce-Jacino (Baltimore)
Dierk Spreen (Lüneburg):
Global Security and Spatial Revolution
Danilo Flores (Berlin):
Envisioning Infiltration. Epistemic Border Disputes of Militarized Astroculture

15.15 COFFEE

15:30 **Panel III: Evolutions**
Chair: Jana Bruggmann (Berlin)
Jordan Bimm (Toronto):
Simulating Mars in the 1950s and the Military Origins of Astrobiology
Patrick Kilian (Zurich):
Darwin vs. Cyborg. Cold War's Struggle for Evolutionary Fitness in Space

16.45 COFFEE

17:00 **Panel IV: Plots**
Chair: Natalija Majsova (Ljubljana)
Jörg Hartmann (Karlsruhe):
"Weltraumschiff I startet." The Dual-Use of a Spaceflight-Science-Fiction-Film between Fact and Fiction, V-2 and Sputnik
Matthias Hurst (Berlin):
"Raumpatrouille – Die phantastischen Abenteuer des Raumschiffs Orion." Defending Earth in a German Spaceship

20.00 DINNER AT RESTAURANT "LANDAUER"

friday, 11 april 2014

09.30 **Feature Presentation II:**
Chair: Daniel Brandau (Berlin/Mainz)
Michael Sheehan (Swansea):
Star Wars – Mars against Venus. Strategy, Science Fiction, and Contrasting Visions of Space Security

10.30 **Panel V: Infrastructures**
Chair: Eva-Maria Silies (Berlin)
Regina Peldszus (Darmstadt):
Architecture of Command. Dual-Use Legacy in Mission Control Centers of Civilian Space Operations
Isabell Schrickel (Lüneburg):
The Geopolitics of Space Mirrors

11.45 COFFEE

12:00 Panel VI: Domination
Chair: Tilmann Siebeneichner (Berlin)
Cathleen Lewis (Washington, DC):
Space Spies in the Open. Military Space Stations and Heroic Cosmonauts after the Moon Race, 1971–1975
Paweł Frelik (Lublin):
War Play. Space Combat and Galactic Conquests in Arcade and Computer Games

13.15 LUNCH

14:00 Panel VII: Depictions
Chair: Joe Maiolo (London)
Colleen Anderson (Cambridge, MA):
The Militarization of Outer Space in East and West German Satirical Cartoons, 1957–1989
Oliver Dunnett (Belfast):
C. S. Lewis and the Moral Threat of Space Exploration

15.15 COFFEE

15:30 Panel VIII: Utopias
Chair: Thore Bjørnvig (Copenhagen)
Simon Spiegel (Zurich):
Utopian Soldiers. Robert Heinlein's "Starship Troopers" as a Utopian Novel
Philipp Theisohn (Zurich):
The Suits of Invasion. Extra-Terrestrial Warfare and the 'Clothing' of the Body Politic in Twentieth-Century Fiction

20.00 DINNER AT RESTAURANT "HEUBERGER"

saturday, 12 april 2014

09.30 Panel IX: Strategies
Chair: Kai-Uwe Schrogl (Paris)
Anthony W. Enns (Halifax):
Satellites and Psychics. The Militarization of Outer and Inner Space
Diethard Sawicki (Paderborn):
Heating up the Ionosphere and Owning the Weather?
High Power Auroral Stimulation in Defense Scenarios and Conspiracy Theories

10.45 COFFEE

11.00 Panel X: Surveillance
Chair: Robert Poole (Preston)
Patryk Wasiak (Wrocław):
Visual Imagery and the Public Life of Anti-Satellite Weapon Systems
Paul E. Ceruzzi (Washington, DC):
The Global Positioning System. Military Origins, Civilian Application, and the Culture of Precise Positioning

12.15 SNACK

13.00 Panel Discussion: Reconfigurations
Chair: Alexander C.T. Geppert (Berlin)
David Edgerton (London), Bernd Greiner (Hamburg), Michael J. Neufeld (Washington, DC)

16.00 END

Colleen Anderson

The Militarization of Outer Space in East and West German Satirical Cartoons, 1957–1989

This presentation rethinks public perceptions of the militarization of outer space by considering satirical cartoons in popular East and West German magazines. In particular, these cartoons challenge the notion that observers of space exploration during the Cold War anticipated a dichotomy of either peaceful exploration or militarization in the cosmos. These satirical cartoons, which featured in East and West German magazines from the 1940s through reunification, demonstrate that East and West German observers had a nuanced understanding of space exploration. The cartoonists simultaneously saw hope, destruction and humor in space, even as they considered its potential militarization. Yet, while they continually offered various meanings for space exploration and predicted various possibilities for the future of space, their cartoons also shared a similar development from the 1950s through the 1970s. In the 1950s, they most often made light of the seriousness with which the US and USSR engaged in space competition; by the 1980s, cartoons routinely focused on the potential for the militarization of the cosmos. While these cartoons speak to East and West perceptions of space, they might also point toward public perceptions of the cosmos more generally. They demonstrate that perceptions of the militarization of space were often not particular to a certain national context and were in fact shared across the Iron Curtain. Therefore, the layers of hope, fear, mockery, and flippancy in these images complicate our perceptions of how citizens on both sides of the Iron Curtain, especially citizens at a frontline of the Cold War, reacted to outer space.

Jordan Bimm

Simulating Mars in the 1950s and the Military Origins of Astrobiology

This paper investigates Mars Jars – small environmental analogs of the Martian surface built by the United States Air Force in the 1950s – to argue that the military field of space medicine played a larger-than-appreciated role in the founding of American astrobiology. Most histories of astrobiology – the study of extraterrestrial life – note that the field got its start in 1957, with molecular biologists studying questions pertaining to the origins of life on Earth. However, life scientists working in the field of space medicine first explored questions of life beyond the Earth theoretically in 1950 and experimentally in 1956. The paper's first section follows the development, use and wider circulation of Mars Jars. Modeled after low-pressure chambers used in high-altitude physiology, Mars Jars were designed to test whether terrestrial life could exist under the atmospheric, temperature and soil conditions thought to exist on the surface of Mars. Bacteria grown under these conditions suggested that microorganisms could survive in alien environments. These experiments were cited in campaigns to sterilize manned and unmanned spacecraft, to avoid forward contamination of the Moon and planets. The second section attempts to explain why these and other contributions from space medicine have been excised from histories of astrobiology and exobiology. It argues that the popular origin story of astrobiology is complicated by contributions from space medicine, the more grisly, military-oriented study of the limits of life. Mars Jars were invented by Hubertus Strughold, a German émigré transferred to the United States in 1947 as part of Operation Paperclip. During the Second World War, Strughold served as head of the Luftwaffe's aviation medicine program and was charged as an accessory to lethal high-altitude experiments performed on concen-

tration camp prisoners during the Nuremburg Doctor's Trial. From 1950 until his retirement in 1968, Strughold published 25 articles and books on topics in astrobiology while working as the first professor of space medicine in the US Air Force. He was dubbed the "Father of Space Medicine" and inducted into the International Space Hall of Fame in 1977. However, Strughold's legacy was tarnished in the 1990s when his wartime connections to the unethical lethal human experiments on concentration camp prisoners were publicized. This presentation suggests that Strughold's association with fascism and unethical human experimentation, along with the fact that many early astrobiologists came from Jewish families, had Marxist leanings, and were vocal opponents of the military's role in space exploration, can account for why early contributions from space medicine are missing from most histories of astrobiology.

Paul E. Ceruzzi

The Global Positioning System (GPS). Military Origins, Civilian Application, and the Culture of Precise Positioning

For centuries, governments have invested resources in the art and science of navigation. These efforts enhanced military power and facilitated world trade, which in turn enhanced the host nation's economic power. Lighthouses, nautical charts, astronomical tables, radio beacons – these were available to civilians as well as navies and air forces. The Global Positioning System (GPS), a satellite-based navigation system conceived in the 1970s, was designed from the outset to follow that pattern. It was a system used by all three branches of the US military, but it was also designed to broadcast at least two sets of coded signals: one for the military and a less accurate civilian signal. The civil code was further deliberately degraded by what was called "Selective Availability." In practice, the degraded civil code was found to be more accurate than planned, and further techniques were developed to give civilians centimeter accuracy. During the 1990–1991 Persian Gulf War, the Pentagon temporarily switched off Selective Availability, which opened up a huge commercial and consumer market not entirely foreseen. Using the language of the Social Construction of Technology (SCOT), the result was the opening of the 'black box' that the US Air Force placed GPS into, with the US military now in an uncomfortable position of maintaining and supporting, at high cost, something that is used worldwide for a host of customers, at no cost. GPS remains, however, under US control. That has led other nations, and the European Union, to develop their own satellite-based navigation systems. In doing so, they need to justify the enormous costs against the promise that the US will provide worldwide, free access to these now-much-more-accurate civilian codes. This paper discusses the history of GPS development and concludes with some observations about whether the "closed world" of military uses of information technology, to use Paul Edwards' term, applies in this case.

Oliver Dunnett

C. S. Lewis and the Moral Threat of Space Exploration

Belfast-born writer C. S. Lewis is primarily known for his Chronicles of Narnia series of fantasy novels, but his lesser-known "Space Trilogy," published in 1938, 1943 and 1945, respectively, is the focus of this presentation. This series of novels represents a moralistic critique of space exploration in an era when technological advancements had started to make the notion of interplanetary travel a distinct possibility. Indeed, for Lewis, human presence in outer space was very much an unwelcome act of militarization, which posed a moral or metaphorical threat to humanity, breaching what he saw as 'God's quarantine regulations.' Lewis's fictional works have undergone a re-appraisal of sorts in recent years, whereby his novels have been set in the wider context of his Medievalist worldview and a Romantic protest against what he called the 'scientifiction' of the early twentieth century. This was characterized by certain trends in scientific culture, such as the increased popularity of the eugenics movement, the mechanization of warfare and the new science fictional futures proposed by writers such as Arthur C. Clarke, H. G. Wells and Olaf Stapledon. These examples and the associated inevitability of militarization in outer space shall form part of the wider context of this presentation, which will then focus on the human body in Lewis's "Space Trilogy," particularly that of the series' protagonist, known as Ransom. What can be seen throughout the series is that Ransom's body functions as a literary device through which sensations of sickness, violence and healing help articulate Lewis's warning about the moral dangers of interplanetary travel and the associated advancements in scientific culture.

Greg Eghigian

Flying Saucers, America, and the Specter of War in Postwar Germany, 1946–1960

While sightings of strange airships date back to the nineteenth century, the years 1946–1960 witnessed a wave of reports of "flying saucer" sightings on both sides of the Atlantic. What attention these reports have garnered from scholars has largely centered on self-identified witnesses and contactees in the United States and the United Kingdom. To date, however, few have traced how reports moved across states and regions and what responses they garnered along the way from non-witnesses. This paper addresses these issues by examining how the print media and public intellectuals in postwar West and East Germany reported on and discussed flying saucer reports. The evidence reveals that flying saucer stories were sustained and spread not simply by true believers, but also by a steady traffic in reports within the mainstream press, beginning with coverage of foreign reports, followed by domestic and local sightings, to editorial and op-ed pieces, and then finally larger investigative analyses. While there was a range of responses to the phenomenon in postwar Germany – e.g., considering UFOs hoaxes, optical illusions, experimental weapons, alien inventions – memories of the Second World War as well as Cold War geopolitics figured heavily in how reported sightings were framed and interpreted on both sides of the iron curtain. Suspicions of secret superpower weapons testing, the threat of nuclear war and anti-American stereotypes were consistently invoked to make sense of the possible terrestrial and extraterrestrial origins of the odd airships. For most true believers and skeptics alike, then, flying saucers not only potentially carried crews, but also messages about the prospects for international peace.

Anthony W. Enns

Satellites and Psychics. The Militarization of Outer and Inner Space

In a speech given in September 1995, President Jimmy Carter reported that during his administration a plane had gone down in Zaire and American spy satellites had been unable to locate the wreckage. The head of the CIA, Admiral Stansfield Turner, enlisted the aid of a woman with psychic powers who "gave some latitude and longitude figures," and according to Carter "we focused our satellites on that point and the plane was there." This speech not only confirmed the existence of a reconnaissance satellite program and a psychic espionage division within the CIA – two clandestine operations that had been declassified only months before through an executive order issued by Bill Clinton – but also indicated the close connections between these two methods of intelligence gathering. The use of spy satellites – a practice known as "remote sensing" – began in the 1960s with the "Corona" project, which involved the use of satellites to provide photographic surveillance of Communist countries. The use of psychic spies – a practice known as "remote viewing" – began in the 1970s at the Stanford Research Institute under the direction of the CIA. Remote sensing and remote viewing both involved the use of coordinate scanning of distant locations for the purpose of intelligence gathering and military mapping. Remote sensing and remote viewing can thus be seen as applications of what media theorist Paul Virilio calls the "logistics of perception" or the weaponization of optical media. It is also significant that the intelligence provided by remote sensing and remote viewing was of a non-analytical nature, as it was limited to shape, form and material. Like remote sensors, therefore, remote viewers functioned as automata that relayed intelligence without conscious mediation; their performance was assessed solely through a calibration of their 'bit rate.' Through a close examination of the concurrent development of remote sensing and remote viewing, this paper shows how space exploration and parapsychology were seen as parallel methods of investigating new areas of knowledge that were subsumed by military interests.

Danilo Flores

Envisioning Infiltration. Epistemic Border Disputes of Militarized Astroculture

According to historian Walter McDougall, one of the three structural forces necessary to initiate the American space program has been 'imagination.' The astonishing accuracy of science-fictional visions in predicting and delineating future technological, societal and historical development, lending an arguably almost prophetic import to such stories, raises the question to what extent the complex relationship between fact and fiction needs to be reconceived as functionally reciprocal and ontologically permeating, so that real-world power relations must consequently be recognized as feeding back into the structuring of the human imagination. What needs to be addressed is the militarization of astroculture itself. As 'space' is situated as much in physical reality as in different modes of mental representation, its militarization will, inevitably, also occur on a psychological level, paralleling political and often secretive efforts to take control of the outer borders of the planetary habitat. This presentation argues that astroculture has been territorialized along closely guarded lines of separation, segmenting the lived experience of the modern subject into falsely dichotomic antagonisms between 'reality' and 'fiction,' 'belief' and 'skepticism' or 'science' and 'pseudoscience.' In this view, the pariah status of ufology might be interpreted as an outcome of weaponized intellectual discourse. This paper aims at tracing an ongoing deterritorialization of the ET imaginary, as evidenced in the increasingly realistic portrayals of alien infiltration in three popular works of science fiction: *The Day the Earth Stood Still* (1951), *2001: A Space Odys-*

sey (1968) and The *X-Files* (1993). The breaking down of the divide between the 'realistic' and the 'fictitious' has reached its apex in contemporary conspiratorial internet culture. This paper investigates if the overcoming of the artificially erected epistemic boundaries of astroculture might result in the eventual integration of humanity into a larger cosmic framework of astropolitics that is not necessarily dominated by human actors.

Paweł Frelik

War Play. Space Combat and Galactic Conquests in Arcade and Computer Games

Galactic struggles and space wars have long been a staple of science fiction literature, cinema and television. During the Cold War such narratives were particularly apt metaphors of the terrestrial political tensions. However, in the middle of the era another medium was conceived by the scientists who were – not accidentally – centrally connected to the military and industrial sector: computer games. It is not a coincidence that one of the first titles was a science fiction game and that it was a space combat simulation. Designed as a demonstration program for the PDP-1 machine at MIT, *Spacewar!* (1962) featured battling spaceships, each armed with a supply of missiles and a hyperspace switch for evasion tactics, and controlled by a player using a keyboard/joystick console. Although conceived as purely utilitarian, *Spacewar!* became the prototype for the first mass-marketed, coin-operated arcade game *Computer Space* (1971) and forked into a wide range of first arcade and then computer titles, including *Space Invaders* (1978), *Galaxian* (1979), *Uridium* (1986) and *Morpheus* (1987), to name just a few. The kinetic visual spectacle of these early games strongly influenced SF cinema during the period, especially the classics of space wars: *Star Wars* (1977) and *The Last Starfighter* (1984). Despite relative simplicity, the cultural significance of these titles cannot be overestimated. Several generations of gamers grew up engaging in space wars and galactic conquests while the in-game political and military configurations both reflected and shaped the cultural responses to the Cold War. This presentation addresses three distinct approaches to the phenomenon: demarcate this often neglected albeit unusual field of arcade and computer games; analyze the dominant representations of military actions in space in the period; and suggest the ways in which these games had a crucial influence on the cultural imaginaries of the period, often feeding into more prominent cinematic representations and paving the way for such contemporary titles as *EVE Online* or *Mass Effect.*

Christopher Gainor

The Nuclear Roots of ICBMs

The decision made in 1954 by the United States Air Force (USAF) to proceed with the creation of its first Intercontinental Ballistic Missile (ICBM) was vital to the creation of US military and civilian space programs. In the wake of the controversy that followed the Soviet Union's launch of Sputnik in 1957, historians and others criticized the USAF for not having begun its ICBM program much earlier. Yet, a re-examination of the USAF's actions shows that military and technological factors relating to nuclear weapons, long-range missiles and other delivery systems weighed more heavily in this decision than has been previously acknowledged. Moreover, similar factors led to the Soviet government's decision at roughly the same time to build its own ICBM. In 1953 and 1954, the creation of thermonuclear or hydrogen bombs meant that ICBMs could be much smaller and have a less stringent accuracy requirement than had previous-

ly been anticipated. Advances in rocket technology, notably a way to deal with the previously intractable problem of destructive heating of bodies re-entering Earth's atmosphere at high speeds, also made ICBMs more feasible. The USAF was criticized for a culture favoring bomber aircraft, but it faced serious challenges creating a bomber force capable of threatening the Soviet Union. Early nuclear weapons were in very short supply and did not lend themselves to use on missiles. These military factors helped decide the timing and form of early ICBMs, and consequently civilian and military space programs in the United States and the Soviet Union. This presentation also examines how development of nuclear weapons affected missile proliferation and space programs in Europe and elsewhere. Changing historical views of Cold War missile and space programs are also discussed.

Alexander C.T. Geppert, Daniel Brandau and Tilmann Siebeneichner

Heavenly Utopias and Ultimate Battlefields. The Dark Side of Global Astroculture

This presentation introduces the principal themes and conceptual framework of the conference. It discusses the argument that, in the twentieth century, outer space has been envisioned as not only a site of heavenly utopias, but also the ultimate battlefield. It addresses the relation between peaceful and aggressive characteristics of human endeavors in outer space and the military dimensions of astroculture in the period between 1942 and 1990 in astropolitics, technoscientific practices and science fiction. The paper explains the five overarching conference themes: rockets and domination; human spaceflight and heroic utopias; space machines; bodies in space; and envisioning sites of war. Along these lines, a reconceptualization of space history with a view towards its military dimensions is linked to a decentralization of the hitherto dominant Cold War perspective. Guidelines on the conference's design and overall structure, thus providing all other contributions with a broad framework, will also be provided.

Jörg Hartmann

"Weltraumschiff I startet." The Dual-Use of a Spaceflight-Science-Fiction-Film between Fact and Fiction, V-2 and Sputnik

In 2010 a film, long thought to be lost, resurfaced from the depths of US military archives: *Weltraumschiff I startet.* This 1938 German science fiction film had been confiscated as Nazi propaganda, since it depicts a heroic trip around the moon in a spaceship which begins from Zeppelin hangars in Friedrichshafen and is monitored from an observatory in "Deutsch-Ostafrika." It is an artifact of its time, reflected not only by its astrofuturistic visions of spaceflight, but also its rare footage of early German rocketry experimenters and liquid-fueled rockets. Because of the accuracy of its scientific elements, the Third Reich forbade the showing of some parts of *Weltraumschiff I startet*, even though it was made by 'Kulturfilm' director and hobby astronomer Anton Kutter. Even more than *Frau im Mond* (1929) or *Kosmicheskiy reys* (1936) this movie is an extraordinary *Zeitgeist*-document from the dawn of the V-2 era. It serves as a missing link between the time when thoughts about spaceflight belonged to hobbyists and originated from techno-romantic ideas,

and the time when rocketry finally became a powerful military research item, a "well-kept secret, [...] broken only by the first V-2 missiles dropping onto London." This presentation analyzes key scenes from *Weltraumschiff I* startet and relates them to their socio-cultural and political background in order to address the dual (mis)use of spaceflight science fiction. Further questions arise when we consider that ideas and scenes from *Weltraumschiff I* startet have been re-used in *When Worlds Collide* (1951) and in *The Space Explorers* (1958), a post-Sputnik TV serial to teach America's youth the fundamentals of astronomy. This presentation thus addresses the question of how closely intertwined the relationships between legitimization, popularization and militarization of spaceflight actually are.

Matthias Hurst

"Raumpatrouille – Die phantastischen Abenteuer des Raumschiffs Orion." Defending Earth in a German Spaceship

In 1966, three years before the first man actually landed on the moon, a fictional spaceship launched from Earth to explore space and battle extraterrestrial enemies in a TV show that became a worldwide cultural phenomenon: the USS Enterprise NCC 1701 in Gene Roddenberry's *Star Trek*. In the same year another ship took off "to boldly go where no man has gone before" and to defend our home planet against alien threats: the Orion VII in the German TV series *Raumpatrouille* ("Space Patrol"), written by Rolf Honold and W. G. Larsen, and directed by Michael Braun and Theo Mezger. The German series – one of the most expensive TV productions of its time – consists of only seven episodes and never became as famous and popular as *Star Trek*, but despite of its short run, it still managed to inspire the audience and retains today a loyal cult following in Germany. With an international crew, representing a united mankind without national states, the Orion travels through outer space and faces several dangerous situations, including the encounter with a hostile alien species called Frogs. Thus the series features a mix of fictional approaches to spaceflight and space technology with heroic adventure and futuristic warfare. *Raumpatrouille* is in many ways very similar to *Star Trek* and its echoes of the political reality of the Cold War, but on the other hand it is also quite distinctive. In particular, the adventures of the Orion are characterized by a less tolerant and optimistic attitude towards contact with extraterrestrials and a more aggressive reaction in situations of conflict. As a specific German vision of the future, albeit informed by an American tradition of science fiction narratives, *Raumpatrouille* is firmly rooted in the cultural tension between progressive hope for peaceful global relations, structures and alliances after the devastating experiences of two world wars and the willingness to military action against a powerful ideological enemy, including the use of weapons of mass destruction ("Overkill"), capable of destroying whole planets. It is a science fiction series that reflects both utopian ideas and a political-ideological reality which is dominated by fear of an subversive enemy, by nuclear armament and strategies of deterrent, a European link, as it were, between NASA and NATO.

Patrick Kilian

Darwin vs. Cyborg. Cold War's Struggle for Evolutionary Fitness in Space

The capture of space was one of the Cold War's main and most prestigious objectives. Inextricably linked with this goal was the necessity to adapt the human body to this new and highly dangerous environment. The extremely hostile surrounding of space demanded an enhanced interaction between life and technology in order to prepare the human body for the undertaking of spaceflight. It was already in 1961 when NASA associated scientists Manfred E. Clynes and Nathan S. Kline described this mission for biological preparation as an evolutionary task. As a consequence the Space Race was at least partially converted into a competition for evolutionary adaption and fitness in space. This scientific utopia converged in a very direct manner with the antagonistic logic of the Cold War: The popular Darwinist idea of the "survival of the fittest" blended with the ideologically propagandized survival of the most successful political and economic system. In this way of thinking, space was not understood as a distinctly military battleground, which was won by armed forces, but as a scientific arena that could be controlled by the most perfect adaption of the human body (as the actual battleground in space). The circulation of Cold War and evolutionary (respectively socio-biological) thought in spaceflight's body-concepts is presented through selected sources (science, pop-science, pop-culture) demonstrating that Cold War in space followed the patterns of a (post-)evolutionary 'struggle' rather than the logic of a direct and militarized warfare.

Cathleen Lewis

Space Spies in the Open.
Military Space Stations and Heroic Cosmonauts after the Moon Race, 1971–1975

During the early 1970s, the Soviet space program adapted to its defeat in the Moon Race. The glorious Soviet cosmic future of the 1960s seemed far away. The Apollo 11 moon landing, the deaths of Korolev, Komarov and Gagarin, and the failures of maiden flight of the Soyuz and all launch attempts of the N-1 launch vehicle augured a dark era for the Soviet space program. Determined not to lose the Space Race as profoundly they had the Moon Race, the Soviet military endeavored to match US Defense Department activities in space. Spurred by hints of a planned American military Manned Orbiting Laboratory (MOL), the Soviet space program launched three military space stations in the 1970s. At the time their official designations were Salyut to blend into civilian space station activities. Equipped with high-resolution cameras and armed with a cannon to ward off attacking satellites, the stations were intended to best anything that the Americans had planned. The gyroscopically controlled ship could even rotate around a site to hold its camera steady and record movement. This Almaz series of Soviet military space stations had only one fully successful mission, a mere 81 days in orbit. Moreover, in the competition between manned and machine, man had clearly lost. The US cancelled its MOL program without a single launch in deference to a far more agile spy satellite, the KH-11. Almaz would have been a footnote in the history of human spaceflight had it not been for the one thing. Unlike the Americans who had planned an independent, secret and parallel space program, the Soviet Union had to conduct their spy activities in public view. Their cosmonauts had to play the dual role of satellite spies and human spaceflight ambassadors. While photography shipping activities, they made spaceflight routine for the Soviet public, reinforcing the sense of continuing Soviet achievement in space.

Regina Peldszus

Architecture of Command.
Dual-Use Legacy in Mission Control Centers of Civilian Space Operations

Despite an explicitly peaceful agenda, the structural framework of civilian space science, application and exploration missions is permeated by organizational and hardware legacies of defense systems. Beyond aspects of technology, design and operation of crewed and uncrewed space platforms, this is also evident in the ground segment, particularly in mission control. As derivatives of the US Apollo program, control centers in Europe developed their own idiosyncrasies from the late 1960s onwards, yet remained informed by evolving defense principles and practices. In deconstructing key elements and characteristics of mission control centers and, within them, control rooms as central nodes and nerve centers of operations, this paper traces the entwined nature of civilian and defense aspects – rather than mere static inheritance – in the context of the ground-based architectural setting of science missions. Architecture, here, is seen both as the design of the tangible, physical environment of a facility, and the system architecture governing the collaboration of human agents, software and hardware. Drawing on theory of human-technology interaction and qualitative systems analysis, the paper decomposes the control room environment and the position of the flight control teams, their immediate practices and terminologies. It contextualizes the command and control paradigm of 'arm and go' with underlying concepts of human-machine interaction and human systems integration. Finally, the paper highlights the role of the stakeholding organizations and contractors who provide staffing and technical support, and who foster a culture of transparency or opacity of operations in view of the public.

Alex Roland

The Cold War in Space

Space war has been cold and passive. The cold mimics the Cold War in which it was born. Space war entails "organized armed conflict between states" – Max Weber's definition of war – but without the shooting, without kinetic attack. And it is passive because it features non-weapon assets that support military operations indirectly. These assets include satellites for communications, reconnaissance, signals intelligence, global positioning and the like. So important have they become that the major space powers – those that have achieved manned spaceflight, i.e. China, Russia and the United States – invest in technologies to protect their own assets and destroy (or incapacitate) those of their adversaries. This cold, passive war repeats the strange and often convoluted logic of the Cold War. To understand why space became militarized in this particular way, one must therefore return to the Cold War. There are three reasons why there has been no hot war in space. First, the Space Age has been entirely confined to the sixty-eight year period of 'The Long Peace,' the absence of Great-Power war from 1945 to the present. Only great powers are capable of conducting space war. Second, within the first decade of the Space Age, the world's two superpowers agreed to constrain conflict in Earth orbit. Those constraints survived the Cold War and continue to keep space war cold and passive. Not Ronald Reagan's Strategic Defense Initiative (SDI), nor George Bush's deployment of ballistic missile defense, nor the emergence of China as the world's third manned-spaceflight power has altered the original consensus. Third, the theoretical, realist argument for space war remains as deeply flawed as it was when the Space Age began. The defining statement of that argument, Everett Dolman's *Astropolitik*, reveals the fundamental contradictions that have forestalled hot war in space.

Diethard Sawicki

Heating Up the Ionosphere and Owning the Weather? High Power Auroral Stimulation in Defense Scenarios and Conspiracy Theories

In 1995, Nick Begich's and Jeane Manning's popular non-fiction bestseller *Angel's Don't Play this HAARP: Advances in Tesla Technology* introduced a seemingly new element into the already rich store of motifs conspiracy theories fed on during the 1990s. In Alaska, the US government and military would heat up the ionosphere by using a giant antenna apparatus sending electromagnetic pulses (radio waves) up into the ionosphere which envelops Earth in about 200–300 km height, i.e. on the threshold of outer space. The facility called HAARP (High Frequency Active Auroral Research Program) indeed still exists near Gakona (Alaska), but it is not well known that it had precursors in and outside the US. This presentation sketches out the development of the basic ideas of Auroral Stimulation (starting with an alleged invention by Nikola Tesla around 1940) and explores whether and when defense engineers began to consider military uses of this technology. Further, it discusses when and why public rumors about manipulations of the ionosphere evolved. The argument is that both aspects of the topic – the 'real' history of the technology and the conspiracy theories related to Auroral Stimulation – are interrelated. Conspiracy theories should not be understood as mad, dysfunctional forms of thinking, but as distorted reflections of something real, misinterpreted by a frightened, mistrusting and insufficiently informed public. Defense theorists and military engineers did and do indeed create science fiction-like war scenarios of a planetary scale – and these phantasms dovetail with existing conspiracy theories or inspire new ones. Thus William S. Burroughs may have been right in a twisted way when he wrote: "The paranoid is the person in possession of all the facts."

Isabell Schrickel

The Geopolitics of Space Mirrors

This paper retraces the history of space mirrors. First suggested by Hermann Oberth in 1923 as a large plate, littered with reflective facets that either shield or concentrate the Sun's energy from or on the Earth's surface, the idea of space mirrors has been revived in different historical constellations. LIFE magazine reported in July 1945 that the Nazis would have developed such a "Sun gun" in order to "burn an enemy city to ashes or to boil part of an ocean." The use of space mirrors as a precision weapon was replaced by the idea to regulate and control the temperature of the terrestrial environment in general. With the beginning of global warming concerns in the 1980s, space mirrors made it into the broad reaction portfolio of geoengineering. They were adapted to the new global threats, visible also in new designs: from the huge single device, positioned more or less stable at Lagrange points to a networked myriad of 'cloud' or individually controlled small mirrors, capable of executing multiple tasks. The presentation describes space mirrors not so much in their capacity to make space itself a potential battlefield but as a techno-fiction that explicates environmental conditions themselves, i.e. by making the relation between Sun and Earth operational.

Michael Sheehan

Star Wars – Mars against Venus. Strategy, Science Fiction, and Contrasting Visions of Space Security

In 2003, Robert Kagan famously argued that Americans and Europeans had contrasting attitudes towards the morality of military power, that on "major strategic and international questions today, Americans are from Mars and Europeans are from Venus." In terms of government attitudes towards the understanding of space security there is truth to Kagan's statement. While European attitudes to space security are complex, it is true that since the advent of European space cooperation in the late 1950s, American and European attitudes towards space have reflected very different images and aspirations, one emphasizing military capability and the pursuit of dominance, the other stressing cooperation, reassurance and the use of space technology for human security and development. From its inception the American space program reflected a mind-set dominated by the fear of the 'other.' The Soviet Union's orbiting of Sputnik in 1957 triggered fear of Soviet victory in the Cold War and dominance of the planet. The public response was the creation of NASA and the lunar program, but the military program was more central and accounted for the vast majority of American launches. This fear of the extended totalitarian threat was reflected in American science fiction movies of the period such as *Them!* (1954) and *Invasion of the Body Snatchers* (1956). It can be seen later in the *Star Wars* period with President Reagan's denunciation of the USSR as 'The Evil Empire.' In contrast, the pioneers of European space cooperation in the early 1960s such as Edoardo Amaldi insisted that it should have "a real European character" and a "peaceful character." Rather than reflecting fear of the outsider, the space program reflected the lessons of Europe's twentieth century wars and the idealism of European and wider international cooperation. It was a vehicle with which to embrace the outsider, a vision similarly reflected in both politics and popular culture.

Simon Spiegel

Utopian Soldiers. Robert Heinlein's "Starship Troopers" as a Utopian Novel

Robert Heinlein's 1959 novel *Starship Troopers* is generally regarded as an early and paradigmatic example of military science fiction, a subgenre of science fiction which focuses on intergalactic battles. The novel, set in a distant future where the Terran Federation is at war with a race of extraterrestrial bugs, tells the story of Johnnie Rico, a young man who, almost by chance, enters a military career. While we learn little about the future society depicted in *Starship Troopers,* one of its features stands out: full citizenship and voting rights are restricted to people who did military service. Since its publication, there has been considerable controversy surrounding the novel (which has been very successful commercially); its critics see it as a typical example of right-wing warmongering. In this perspective the bugs stand for Soviet aggression; their organization is at one point even explicitly called "total communism." This presentation argues for a different reading of *Starship Troopers*. Based on Thomas Schölderle's study *Utopia und Utopie*, it seeks to understand Heinlein's novel as an utopian text in the classical tradition. While the majority of critics have focused on the question of "who gets the franchise," the Mobile Infantry – Johnnie's unit – is considered as the actual focus of the novel. The Terran Federation is hardly described, but there are endless explanations of military routine. On the other hand, there is – surprising for military science fiction – not very much action in the novel. Ultimately, the battle scenes serve a purpose very similar to the travelogues of Morus et al. In the end, one of the supposed paradigmatic examples of Cold War science fiction is not really much interested in international politics but in portraying the mobile infantry as a utopian entity and the common grunt as perfect utopian citizen.

Dierk Spreen

Global Security and Spatial Revolution

This presentation discusses the relationship between the concepts of spatial revolution and world society according to Carl Schmitt and Niklas Luhmann, focusing on the connection between global security and orbital satellite systems. In this view, the orbital space above earth has to be addressed in Schmittian categories as a "new space." Despite the fact that Schmitt himself refused to make such a claim because he linked his space concept to territorial and political relations on earth, the extension of the category to include orbit is illuminating, especially when we consider that orbital satellite systems are mainly targeted at Earth; less than ten percent of all orbital systems are directed outward. In this view military and surveillance systems play an important role in the new world order of 'global security,' a term that means a political and normative regime of prevention against violence to secure the communication of world society. This military and political 'colonization' of orbit is truly a 'third spatial revolution' because it is connected to a new political and spatial order. Schmitt, who did not subscribe to the political and normative consequences of this new order, criticized its phenomena, like the League of Nations or the Treaty of Versailles. He even refused to see the political consequences of space travel and therefore entrapped himself in a discursive 'fight' against it. In a more Luhmannian perspective, by contrast, the political characteristics of this revolution can be explained. In Luhmann's sociology, territorial structures are losing their societal importance, too. But in contrast to Schmitt, Luhmann is open to think about a political world system and a global regime of security. In a combined view of both Schmitt's and Luhmann's theory, interdependencies between the orbital colonization by automatic systems on the one hand and the development of a global security order on the other can be analyzed. Therefore, because of its atopic structure the orbit can be viewed as the 'space of world society.' In short, my main argument is that the colonization of orbit by Earth-targeting satellites is an important part of the global political regime of security. This colonization marks a new spatial revolution that has to be seen within the context of a fundamental change in the political structure on the planet's surface.

Philipp Theisohn

The Suits of Invasion. Extra-Terrestrial Warfare and the 'Clothing' of the Body Politic in Twentieth-Century Fiction

In the midst of the epic war-scenario outlined in *Starship Troopers* (1959) by Robert Heinlein, we encounter an intriguing type of clothing, namely a combat suit: "Suited up, you look like a big steel gorilla, armed with gorilla-sized weapons." To overlook the significance of this suit is inaccurate: while, at first sight, the suit appears to be nothing more than a gadget arisen from space-war imagination, insight into its technological design (as extensively described by the narrator) reveals its structural significance. The combat suit transforms the body of the fighting soldier into the 'body politic' of the Space Age. By wearing the suit, men and women in space become representatives of a civilization that understands outer space as an area that admits no civilians. Therefore, not only does the clothing of those who fight for terrestrial affairs on other planets strengthen their bodily skills and connects them to information channels, but it also inscribes laws of sovereignty, equality and efficiency, thus reprogramming the wearer's understanding of culture, sex and morals. This presentation develops as follows: First, starting with Heinlein, it sketches a brief historical outline of the suits in twentieth-century fiction based on literature, comics and film. Second, the historical outline is read

against twentieth-century political thought. Successively, as the 'body politic' proves to be a 'political body,' gender becomes an essential category of interpretation. Furthermore, it demonstrates how the progresses of technology, robot skills and nanotechnology function as fundamental stimulators for the concept of the suit. Third, as the suit aims to make humans match their galactic opponents, its structure is strongly influenced by the abilities, functions and design of the extraterrestrial body (as Heinlein's novel clearly shows). The history of the space combat suit then can be told only if it reflects on the bodily performance of aliens in fiction.

Patryk Wasiak

Visual Imagery and the Public Life of Anti-Satellite Weapon Systems

This paper explores the emergence of public life of anti-satellite (ASAT) weaponry during the late Cold War by showing the role of visualizations in the public understanding of the feasibility of a particular techno-scientific artifact. Along with detailed descriptions of principles of successful application of this space weapons system, a visual imagery was brought to the public with several scientific illustrations: artistic renderings and diagrams. The genre of 'righteous artist's renderings' which provides 'scientifically correct' but also dramatic images was heavily influenced by space art. In the 1980s, such images of scenes with successful deployment of ASAT weapons were included in material which aimed to bring this weapon to public attention. This presentation discusses the aesthetics of such artistic renderings with reference to the studies of scientific illustration. While offering a particular case study, it contributes to the discussion on relevant social actors and artifacts, which played a significant role in the envisioning of space warfare in the context of the 'Star Wars' decade.

Colleen Anderson

Harvard University, Cambridge, MA (USA)

Colleen Anderson is a PhD candidate in the history department at Harvard University. She studies the history of Germany, twentieth-century Europe and the global Cold War, with a particular interest in the history of the future, outer space and the intersection of society and technology. Her current project is a social and cultural history of outer space in East and West Germany, which uses perceptions and presentations of outer space to reconsider how East and West German politicians, scientists, and amateur enthusiasts saw their societies, each other, and the Cold War world.

Jordan Bimm

York University, Toronto (CA)

Jordan Bimm is a fourth-year PhD student at York University's Graduate Program in Science and Technology Studies in Toronto, Canada. His dissertation focuses on the construction of the American astronaut during the 1950s by tracing the development of astronaut selection requirements between a host of related fields including space medicine, space psychology and human factors engineering. The goal of his dissertation is to understand why certain bodies were first considered 'best' for work in outer space, and what social, political and technical ideas informed these choices and were conveyed through them. He has presented papers on topics in the history of space medicine and space psychology at meetings of the Society for the History of Technology (SHOT), the Society for the Social Studies of Science (4S), the History of Science Society (HSS), and the International Congress for History of Science, Technology, and Medicine (ICHSTM). In 2013, his article 'Primate Lives in Early American Space Science' appeared in the journal *Quest: The History of Spaceflight*. Another article, 'Rethinking the Overview Effect' won the 2013 Sacknoff Prize for Space History and will be published in *Quest* in 2014.

Thore Bjørnvig

Independent Scholar, Copenhagen (DK)

Thore Bjørnvig has an MA in the History of Religions from the University of Copenhagen, is an independent scholar, and works as a freelance writer. His main research interests lie in areas connected to intersections between science fiction, spaceflight, and religion. Recently published articles include 'Outer Space Religion and the Ambiguous Nature of *Avatar's* Pandora' (2013) and 'The Holy Grail of Outer Space: Pluralism, Druidry, and the Religion of Cinema in *The Sky Ship*' in the journal *Astrobiology* (2012). He has also co-edited a special issue of the journal *Astropolitics* on spaceflight and religion (2013), to which he contributed an article on Frank White's *Overview Effect*. His current research focuses on the cultural history of space toys and LEGO's space themes, and religious aspects of the Dutch Mars One project.

Katherine Boyce-Jacino

Johns Hopkins University, Baltimore, MD (USA)

Katherine Boyce-Jacino is a PhD candidate in the Humanities Center at the Johns Hopkins University in Baltimore, MD. Prior to arriving at Johns Hopkins, she earned a BA with honors in 2010 from Wesleyan University in History and Astronomy. In 2011 she was a visiting research fellow at the Max Planck Institut für Wissenschaftsgeschichte in Berlin. She is currently a visiting doctoral student at the Emmy Noether Research Group 'The Future in the Stars: European Astroculture and Extraterrestrial Life in the Twentieth Century' at Freie Universität Berlin. Her dissertation project is tentatively titled "Planetaria and the Architecture of the Sublime," and focuses on the emergence of planetaria in Weimar Germany and their spread across Western Europe to the United States in the interwar period.

Daniel Brandau

Freie Universität Berlin (D)

Daniel Brandau is a PhD candidate and research associate in the Emmy Noether Research Group 'The Future in the Stars: European Astroculture and Extraterrestrial Life in the Twentieth Century' at the Friedrich-Meinecke-Institut of Freie Universität Berlin. He studied history, German language and literature and educational science at Universität Bielefeld where he received his BA in 2007 and his MEdu in 2010. At the University of Cambridge he finished an MPhil in Modern European History in 2009. His PhD project at Berlin focuses on the "Plausible Future: Rocket Enthusiasm in Germany, 1920–1960," studying visions of future spaceflight and reciprocities with socio-cultural discourse from the period of early rocket societies to the first manned missions. In 2013, he was Guggenheim Fellow at the National Air and Space Museum in Washington, DC, and is currently a fellow of the Institut für Europäische Geschichte in Mainz.

Jana Bruggmann

Freie Universität Berlin (D)

Jana Bruggmann is a PhD candidate and research associate in the Emmy Noether Research Group 'The Future in the Stars: European Astroculture and Extraterrestrial Life in the Twentieth Century' at the Friedrich-Meinecke-Institut of Freie Universität Berlin. Her PhD project, tentatively titled "Looking Back: The View of Earth from Outer Space, 1900–1975," focuses on pictorial depictions of the Earth seen from outer space from Flammarion to the renowned space photographs 'Earth Rise' and 'Blue Mable.' Bruggmann received a BA in Art and Design Education from Hochschule Luzern Design & Kunst in 2009, and an MA in Curating and Museum Education from Zürcher Hochschule der Künste in 2011. From 2012 to 2013 she worked as research assistant at Kunsthaus Zug and curated a number of exhibition projects in Luzern.

Paul E. Ceruzzi
National Air and Space Museum, Washington, DC (USA)
Paul E. Ceruzzi is Chairman of the Space History Division at the Smithsonian Institution's National Air and Space Museum in Washington, DC. He received his BA in American Studies from Yale University in 1970 and a PhD, also in American Studies, from the University of Kansas in 1981. Prior to becoming a curator at the Smithsonian, he taught history at Clemson University in South Carolina. At the museum, he has worked on several public exhibitions, including "Beyond the Limits: Flight Enters the Computer Age," "Space Race," "How Things Fly," and most recently, "Time and Navigation," which covers the art and science of navigation from eighteenth century seafarers to the current systems of global satellites. Ceruzzi has written several books on the history of computing and aerospace technology, including *Beyond the Limits: Flight Enters the Computer Age* (1989); *Internet Alley: High Technology in Tysons Corner* (2008); and most recently *Computing: A Concise History* (2012). He is currently working on a social and technical history of the Global Positioning System.

Oliver Dunnett
Queen's University, Belfast (IE)
Oliver Dunnett is a lecturer in human geography at Queen's University, Belfast, and was awarded his PhD by the University of Nottingham in 2011. As a cultural, historical and political geographer, his research interests focus on the ways in which cultures of science, technology and outer space are connected to questions of place, landscape and identity in the twentieth century. He has explored these themes through research on the British Interplanetary Society, identifying a national culture of 'British outer space' in the mid-twentieth century with connections to well-known figures such as Arthur C. Clarke, Patrick Moore and C. S. Lewis. He has further developed these ideas by examining geographies of light pollution and amateur astronomy in Britain, whilst he has concurrent research interests in critical geopolitics and the geographies of popular culture, particularly the medium of comics and the genre of science fiction. Recent publications in the journals *Cultural Geographies* and *Social and Cultural Geography* reflect these research interests.

David Edgerton
King's College London (UK)
David Edgerton graduated from St John's College Oxford and Imperial College London. After teaching at the University of Manchester he became the founding director of the Centre for the History of Science, Technology and Medicine at Imperial College London (1993–2003) where he was also Hans Rausing Professor. He joined the History department at King's College London with the Centre on its transfer to King's in August 2013, where he is the Hans Rausing Professor of the History of Science and Technology and Professor of Modern British History. He is the author of a sequence of books on twentieth-century Britain: *England and the Aeroplane: An Essay on a Militant and Technological Nation* (1991), *Science, Technology and the British Industrial 'Decline,' 1870–1970* (1996), *Warfare State: Britain, 1920–1970* (2005) and *Britain's War Machine: Weapons, Resources and Experts in the Second World War* (2011). He is also the author of *The Shock of the Old: Technology and Global History Since 1900* (2006). His first book has recently been republished as *England and the Aeroplane: Militarism, Modernity and Machines* (2013).

Greg Eghigian
Pennsylvania State University, State College, PA (USA)
Greg Eghigian is Associate Professor of Modern History and the former director of the Science, Technology, and Society Program at Pennsylvania State University. A historian of the human sciences, he is the author and editor of a number of books on the history of social deviance, including *The Corrigible and the Incorrigible: Science, Medicine, and the Convict in Contemporary Germany* (presently under consideration), *From Madness to Mental Health: Psychiatric Disorder and Its Treatment in Western Civilization* (2010) and *The Routledge History of Madness* (2016).

Anthony W. Enns
Dalhousie University, Halifax, Nova Scotia (CA)
Anthony W. Enns is Associate Professor of Contemporary Culture in the Department of English at Dalhousie University in Halifax, Nova Scotia. His essays have appeared in such journals as *The Senses and Society, Screen, Culture, Theory & Critique, Journal of Popular Film and Television, Quarterly Review of Film and Video, Popular Culture Review, Studies in Popular Culture and Science Fiction Studies.* His edited collections include *Screening Disability: Essays on Cinema and Disability* (2001); *Sonic Mediations: Body, Sound, Technology* (2008); and *Vibratory Modernism* (2013).

Danilo Flores
Freie Universität Berlin (D)
Danilo Flores is a BA student in the Department of Philosophy at Freie Universität Berlin. He has a special interest in historical and contemporaneous debates on extraterrestrial life. His bachelor thesis examines the UFO phenomenon from the perspective of sociocultural anthropology, studying how anomalous events in the sky relate to twentieth-century science-fictional accounts of alien encounters.

Paweł Frelik
Maria Curie-Skłodowska University, Lublin (P)
Paweł Frelik teaches in the Department of American Literature and Culture at Maria Curie-Skłodowska University in Lublin and at the American Studies Center of the University of Warsaw. His research and writing interests include science fiction

visualities, contemporary experimental fiction, unpopular culture, and cross-media storytelling. He has published widely in these fields, including the edited volume *Playing the Universe: Games and Gaming in Science Fiction* (2007), and serves on the boards of *Science Fiction Studies, Extrapolation, and Journal of Gaming and Virtual Worlds.* Frelik is currently President of the Science Fiction Research Association.

Christopher Gainor
Independent Scholar, Sidney (CA)
Christopher Gainor is a historian of technology who has written extensively on the history of Canada's space program, and on the interactions between Canada's aerospace industry and space programs outside Canada. In recent years, he has been writing about the early history of intercontinental ballistic missile programs in the United States and the Soviet Union. He holds a PhD from the University of Alberta, and has taught at the University of Victoria and the Royal Military College of Canada. Gainor has written four books and published numerous articles in journals such as *Technology and Culture* and *Quest: The History of Spaceflight Quarterly*.

Alexander C.T. Geppert
Freie Universität Berlin (D)
Alexander Geppert directs the Emmy Noether Research Group 'The Future in the Stars: European Astroculture and Extraterrestrial Life in the Twentieth Century' at the Friedrich-Meinecke-Institut of Freie Universität Berlin. He received master's degrees from Johns Hopkins University and Georg-August-Universität Göttingen, and a PhD from the European University Institute in Florence. Geppert has held fellowships at the University of California at Berkeley, the EHESS in Paris, the German Historical Institutes in London and in Paris, the Internationales Forschungszentrum Kulturwissenschaften in Vienna, the Kulturwissenschaftliches Institut in Essen, at Harvard University and at the University of Cambridge. Recent publications include *Fleeting Cities: Imperial Expositions in Fin-de-Siècle Europe* (2010, 2013); *Wunder: Poetik und Politik des Staunens im 20. Jahrhundert* (2011, co-ed.); *Imagining Outer Space: European Astroculture in the Twentieth Century* (2012, ed.); and *Astroculture and Technoscience* (2012), a special issue of *History and Technology*. At present, he is completing a comprehensive cultural history of the European Space Age.

Bernd Greiner
Hamburger Institut für Sozialforschung (D)
Bernd Greiner studied history, political science and American studies at Philipps-Universität Marburg, Johann Wolfgang Goethe-Universität in Frankfurt am Main and Millersville University, Pennsylvania. He received his PhD in political science in 1984 with a thesis on the National Security Council under Truman and Eisenhower and completed his *Habilitation* at Universität Hamburg in 1997 with a study on the "Morgenthau legend." From 1984 to 1989, Bernd Greiner taught at the universities of Münster and Oldenburg and served on the editorial board of *Englisch-Amerikanische Studien*. He has been a member of the research staff at the Hamburger Institut für Sozialforschung since 1989 and teaches history at Universität Hamburg where he was appointed adjunct professor in 2004.

Jörg Hartmann
Karlsruher Institut für Technologie (D)
Jörg Hartmann is a PhD candidate at Karlsruhe Institute of Technology (KIT) where he received an MA in German literature and media studies. In his dissertation project "Spaceship with Spectator," he illustrates, through the lens of Hans Blumberg's philosophy, how science fiction films from Méliès (1902) to Scott (2012) can be seen as 're-occupation' of one of mankind's oldest spatial metaphors, life as a sea-faring voyage. Hartmann's research interests include the history of ideas as well as film studies, spectatorship and science fiction. He is an active member of two academic groups in which he discusses his findings: "Formatting of Social Space" (KIT), and "Concepts of Space 1600/1900". He has been a visiting assistant at Yale University and has taught graduate courses on theories of media culture, space- and time travel in science fiction films, and on figurative speech. His most recent publication is 'Der erste Raumschiffbruch der Filmgeschichte: G. Méliès' Filme metaphorologisch betrachtet', in: Lars Schmeink and Hans-Harald Mueller (eds.): *Fremde Welten: Wege und Räume der Fantastik im 21. Jahrhundert* (2012).

Matthias Hurst
Bard College Berlin (D)
Matthias Hurst studied German literature and language, art history and psychology at Ruprecht-Karls-Universität in Heidelberg. He received his MA in 1993, his PhD in 1995 and his Habilitation in literature and film studies in 2000. He taught German literature, comparative literature and film studies at Universität Heidelberg (1996–2001) and as a guest lecturer at the University of Reading (1998) and the Université Paul Valéry in Montpellier (1999). Hurst has published on narration in literature and film, film adaptations of literary works, film interpretation and genre films. In Heidelberg he was also working on the pilot project 'Studien-Coaching,' a newly developed, highly individual and personality-based form of student counseling (2001–2003). Since 2003 Matthias Hurst has been teaching at Bard College Berlin (formerly ECLA European College of Liberal Arts, Berlin), since 2011 as Professor of Literature and Film Studies.

Patrick Kilian
Universität Zürich (CH)
Patrick Kilian is a PhD candidate in History at Universität Zürich and, since October 2013, a research assistant in the research project 'Spaces of Knowledge: Cold War Astronau-

tics and Meteorology in the Public Sphere, 1945–1990.' His dissertation on the "Body History of Spaceflight in Popular Media during the Cold War" is supervised by Professor Philipp Sarasin. Kilian has studied history and philosophy at Universität Mannheim from 2007 to 2012, where he also taught a seminar after his graduation. He has recently published *Georges Bataille, André Breton und die Gruppe Contre-Attaque: Über das 'wilde Denken' revolutionärer Intellektueller in der Zwischenkriegszeit* (2013).

Cathleen Lewis
National Air and Space Museum, Washington, DC (USA)
Cathleen Lewis is Curator of International Space Programs and Spacesuits at the Smithsonian Institution's National Air and Space Museum, specializing in Soviet and Russian programs. Lewis has completed both a bachelor's and a master's degree in Russian and East European Studies at Yale University and completed her dissertation for her PhD in History, "The Red Stuff: A History of the Public and Material Culture of Early Human Spaceflight in the USSR, 1959–1968," at George Washington University in 2008. Her current research is on the history of the public and popular culture of Russian fascination with the idea of human spaceflight in the Soviet Union. She has written about the artifacts in the Smithsonian's Soviet and Russian collection and has published articles comparing the Soviet and American approaches to exhibiting spaceflight during the Space Race and the history of film portrayals of spaceflight prior to Yuri Gagarin's historic flight. She is also working on a comparative history of the development of American and Russian spacesuits.

Joe Maiolo
King's College London (UK)
Joe Maiolo is Professor of International History in the Department of War Studies at King's College London. He holds BA and MA degrees in History and Philosophy from the University of Toronto, and a PhD from the London School of Economics. He is the editor of *The Journal of Strategic Studies*, co-editor of *The Strategy Reader* (2nd edn. 2014), a member of the editorial board of *Intelligence & National Security*, and a fellow of the *Royal Historical Society*. He is also an editor of the *Cambridge History of the Second World War*. His most recent book is *Cry Havoc: The Arms Race and the Second World War, 1931–41* (2010).

Natalija Majsova
University of Ljubljana (SI)
Natalija Majsova is a third year PhD candidate at the University of Ljubljana. She is a researcher at the Centre for Cultural and Religious Studies and teaching assistant at the Department of Cultural Studies. Her research interests include Russian and Soviet film, as well as cultural studies and film theory. Her PhD project focuses on outer space in contemporary Russian film. It examines the topology, narratives, and imagery of outer space (*kosmos*) in Russian film of the past decade (2001–2011) from the perspective of Bakhtinian cultural studies, underscoring the polyphony of various discourses and images that constitute *kosmos* in Russian film today, rather than focusing on the infamous ideology of (post)Soviet outer spatial conquest. Natalija Majsova is a junior member of the COST working group In *Search of Transcultural Memory* and collaborates with the Cultural Centre for European Space Technologies in Vitanje, Slovenia. At present, she is also a visiting doctoral student at the Emmy Noether Research Group 'The Future in the Stars: European Astroculture and Extraterrestrial Life in the Twentieth Century' at Freie Universität Berlin.

Michael J. Neufeld
National Air and Space Museum, Washington, DC (USA)
Michael J. Neufeld is a Museum Curator in the Space History Division of the National Air and Space Museum, Smithsonian Institution. From 2007 to 2011 he served as Division Chair. Born and raised in Canada, he has four history degrees, including a PhD from Johns Hopkins University in 1984. Neufeld has written three books, *The Skilled Metalworkers of Nuremberg* (1989), *The Rocket and the Reich* (1995), which won two book prizes, and *Von Braun* (2007), which has won three awards, and has edited four others. He has appeared on numerous television and radio programs, notably on the History Channel, PBS, NPR, BBC and the German ZDF.

Regina Peldszus
European Space Agency, Darmstadt (D)
Regina Peldszus is a design researcher focusing on human-technology interaction issues in complex sociotechnical systems. She is currently an Internal Research Fellow at the European Space Agency, based in the Advanced Mission Concepts Office at the European Space Operations Centre. Her current research interests include system characteristics in view of failure and resilience; fidelity of live simulation environments; and synthesis of operational evidence and scenario approaches in models and simulation. She holds a PhD in design research with a focus on aerospace from Kingston University, London, and an MA in design studies from Central Saint Martins, London. She has completed related programs at the International Space University and the Swedish Institute of Space Physics in Kiruna. Peldszus has also been a guest lecturer at the Architectural Association School of Architecture, the Royal College of Art, the International Space University, and the University of California, Los Angeles.

Markus Pöhlmann
Zentrum für Militärgeschichte und Sozialwissenschaften der Bundeswehr, Potsdam (D)
Markus Pöhlmann is a senior historian at the German Armed Forces Centre of Military History and Social Sciences (ZMS-

Bw) in Potsdam. He studied history, English literature and communication studies at the universities of Augsburg, Galway and Bern. He has taught at Munich (LMU), Bern and Potsdam. In 2007, he held a Leverhulme Visiting Fellowship at the University of Salford. He has been a staff member of the ZMSBw since 2008. His major fields of research are twentieth-century German military history, the history of military intelligence, and the relationship between the military and the media. He is currently preparing a history of the tank in Germany between 1890 and 1945. His publications include *Kriegsgeschichte und Geschichtspolitik: Der Erste Weltkrieg. Die amtliche deutsche Militärgeschichtsschreibung, 1914–1956* (2002); 'German Intelligence at War, 1914–1918,' in: *Journal of Intelligence History 5* (2005); and 'Planet Terror: Krieg und Bürgerkrieg im Zombiefilm seit 1968,' in: *Mittelweg* (2010).

Robert Poole
University of Central Lancashire, Preston (UK)
Robert Poole is a British historian and author of *Earthrise: How Man First Saw the Earth* (2008). He is currently Guild Research Fellow at the University of Central Lancashire, an Associate of the Centre for the History of Science, Technology and Medicine, University of Manchester, and an Associate Member of the Emmy Noether Research Group 'The Future in the Stars: European Astroculture and Extraterrestrial Life in the Twentieth Century' at the Friedrich-Meinecke-Institut of Freie Universität Berlin. Recent publications include 'The Challenge of the Spaceship: Arthur C. Clarke and the History of the Future, 1930–1970', in: *History and Technology* (2012); *'2001: A Space Odyssey* and the Dawn of Man,' in: Peter Kramer (ed.): *Stanley Kubrick: New Perspectives* (2014); 'What was Whole about the Whole Earth?,' in: Simone Turchetti and Peder Roberts (eds.), *The Surveillance Imperative: The Rise of the Geosciences during the Cold War* (forthcoming); and 'The Myth of Progress: *2001: A Space Odyssey,*' in: Alexander C.T. Geppert (ed.): *Post-Apollo: Outer Space and the Limits of Utopia* (forthcoming).

Alex Roland
Duke University, Durham, NC (USA)
Alex Roland is Professor of History Emeritus at Duke University, where he taught military history and the history of technology for 29 years. During the current academic year he is the Charles Boal Ewing Professor of History at the US Military Academy at West Point. From 2011 to 2012 he was visiting professor of history at the School for Advanced Air and Space Studies at the US Air University. From 1973 to 1981, Roland was a historian with the National Aeronautics and Space Administration. His publications include *Model Research: The National Advisory Committee for Aeronautics, 1915–1958* (1985); *A Spacefaring People: Perspectives on Early Spaceflight* (2005; ed.); *Men in Arms: A History of Warfare and Its Interrelationships with Western Society* (1991; with Richard A. Preston and Sydney F. Wise); and *The Military-industrial Complex* (2001). His November 1985 article, 'The Shuttle: Triumph or Turkey?' in *Discover Magazine* established his reputation as a critic of America's manned spaceflight program. He is a former president of the Society for the History of Technology.

Diethard Sawicki
Verlag Ferdinand Schöningh, Paderborn (D)
Diethard Sawicki is the directing editor for history at Ferdinand Schöningh publishers (Paderborn). His doctoral thesis (2002) is a history of ghost-seeing and spiritualism in Germany, 1770–1900. Since then he has published mainly on cultural history, specializing in the relationship of esotericism, utopianism and technology since the eighteenth century. His publications on the twentieth century include 'Vom Magnetismus zur Techgnosis: Konjunkturen und Transmutationen der Magie im 19. und 20. Jahrhundert,' in: Jan Assmann and Harald Strohm (eds.): Magie und Religion (2010); 'Das wunderbare Leuchten einer erneuerten Welt: Wilhelm Reichs Bioexperimente und seine Entdeckung der Orgonenergie,' in: Alexander C.T. Geppert and Till Kössler (eds.): Wunder (2011); '"Dirty Thinking:" Moderne Esoterik als theoretische und methodische Herausforderung,' in: Monika Neugebauer-Wölk et al. (eds.): *Aufklärung und Esoterik: Wege in die Moderne* (2013); 'Weltraum – Orgon – Mensch: Wilhelm Reichs Kosmologie, Atomangst und Medien in den USA der 1950er Jahre,' in: Eva Johach and Diethard Sawicki (eds.): *Übertragungsräume: Medialität und Raum in der Moderne* (2014).

Isabell Schrickel
Leuphana Universität, Lüneburg (D)
Isabell Schrickel is a PhD candidate at MECS Institute for Advanced Study in Media Cultures of Computer Simulation at Leuphana Universität in Lüneburg. She studied at the universities of Berlin and Basel and received her MA in 2010 with a thesis on the media history of weather forecasting. Between May 2011 and April 2013, she worked as a research associate at the DFG-funded project 'Zeit – Bild – Raum: Das Projektionsplanetarium zwischen Medienästhetik und Wissensrepräsentation' at Technische Universität Berlin. She has taught seminars both at Humboldt-Universität Berlin and at Leuphana Universität. Her research at MECS focuses on the influence of computer simulations on the knowledge cultures of climate research.

Kai-Uwe Schrogl
European Space Agency, Paris (F)
Kai-Uwe Schrogl is the Head of the Relations with Member States Department in the Director General's Cabinet of the European Space Agency (ESA) at its headquarters in Paris. From 2007 to 2011, he was the Director of the European Space Policy Institute (ESPI) in Vienna, a European think tank for space policy. He has been a delegate to numerous

international forums and recently served as the chairman of various European and global committees, including the ESA International Relations Committee and two United Nations Committee on the Peaceful Uses of Outer Space, UNCOPUOS, plenary working groups of the Legal Subcommittee, the one on the launching state and the other on the registration practice, both leading to UN General Assembly Resolutions. Kai-Uwe Schrogl has written or co-edited 15 books and more than 130 scholarly articles and reports in the fields of space policy and law as well as telecommunications policy. He is Vice President of the International Institute of Space Law, member of the International Academy of Astronautics (recently chairing its Commission on policy, economics and regulations) and the Russian Academy for Cosmonautics as well as Corresponding Member of the French Air and Space Academy. He holds a doctorate degree in political science and is an Honorary Professor of international relations at Eberhard Karls Universität Tübingen.

Michael Sheehan
University of Swansea, Wales (UK)
Michael Sheehan is Professor of International Relations at the University of Swansea and Director of the Callaghan Centre for the Study of Conflict. He was formerly Professor of International Relations at the University of Aberdeen, where he was Director of the Scottish Centre for International Security and Director of the Space Policy Research Unit. He is the author of ten books and numerous articles on international security, including *Arms Control: Theory and Practice* (1988); *The Balance of Power* (1995); *New Dimensions of Security in Central and Southeastern Europe* (1998, co-ed.); *International Security* (2000); *International Security: An Analytical Survey* (2005); *The International Politics of Space* (2007); and *Securing Outer Space* (2009, co-ed.). His current research focuses on the ethical and legal implications of anti-satellite warfare and on understandings of security by the Sami of arctic Europe.

Tilmann Siebeneichner
Freie Universität Berlin (D)
Tilmann Siebeneichner is Research Associate in the Emmy Noether Research Group 'The Future in the Stars: European Astroculture and Extraterrestrial Life in the Twentieth Century' at the Friedrich-Meinecke-Institut of Freie Universität Berlin. He holds a degree in philosophy and history, and graduated from the Georg-August-Universität Göttingen in 2011 with a PhD dissertation on the workers' militia in the GDR. From 2010 to 2012 he worked as a research associate at the Graduiertenkolleg 'Generationengeschichte' in Göttingen. Recent publications include *Montagen zur Herrschaftspraxis in der Klassischen Moderne: Alltagshistorische Perspektiven und Reflexionen* (2012, co-ed.); and *Proletarischer Mythos und realer Sozialismus: Die Kampfgruppen der Arbeiterklasse in der DDR* (forthcoming). His current research focuses on the militarization of outer space in the 1970s.

Eva-Maria Silies
Freie Universität Berlin (D)
Eva-Maria Silies is a research coordinator in the research division of Freie Universität Berlin. Previously, she worked as a research associate at Leuphana Universität Lüneburg and at the department of history at Universität Hamburg. She received a scholarship from the research training group 'Generationengeschichte' at Georg-August-Universität Göttingen and completed her PhD in 2009. Her PhD thesis dealt with the history of the contraceptive pill in Western Germany and was published as *Liebe, Lust und Last: Die Pille als weibliche Generationserfahrung in der Bundesrepublik, 1960–1980* (2010). Eva-Maria Silies has published a number of articles on the history of sexuality, the cultural history of the Federal Republic of Germany in the 1960s and 1970s, and on gender history.

Simon Spiegel
Hochschule der Künste Zürich (CH)
Simon Spiegel studied German literature and linguistics, film studies and history at Universität Zürich and Humboldt Universität in Berlin. He completed his PhD dissertation at the Institute of Cinema Studies at Universität Zürich from 2003 to 2006, which examined the poetics of the science fiction film. The dissertation was published as *Die Konstitution des Wunderbaren: Zu einer Poetik des Science-Fiction-Films* (2007). Since then he has held teaching assignments in film studies on science fiction film, genre theory, Stanley Kubrick, the American independent film and theory of screenwriting. In 2010 he published *Theoretisch Phantastisch: Eine Einführung in Tzvetan Todorovs Theorie der phantastischen Literatur*. From 2011 to 2013 he was an assistant lecturer at the Institute for the Performing Arts and Film at the Hochschule der Künste Zürich. Since May 2012 he has been a researcher in the interdisciplinary Swiss National Science Foundation research project 'Analog/Digital,' which focuses on the emotional impact of traditional film stock vs. digitally recorded films.

Dierk Spreen
Leuphana Universität, Lüneburg (D)
Dierk Spreen completed his Habilitation in 2006. From 2008 onwards he held various deputy professorships in sociology, sociology of media and communication studies at the universities of Paderborn and Lüneburg. Spreen is the deputy chairman of the *Gesellschaft für Kultur und Raumfahrt*. Among his publications are *Die dritte Raumrevolution* (2012, co-ed.) and *Kultur und Raumfahrt* (forthcoming, co-ed.).

Philipp Theisohn
Universität Zürich (CH)
Philipp Theisohn is Professor of Literary Studies in the German Department at Universität Zürich. He studies and teaches European and German literature from the thirteenth to the twenty-first century, and currently specializes in the re-

lation between prognostics and poetics. He is project director of 'Conditio extraterrestris,' which explores the galaxy as space of literary imagination and communication from 1600 to the present.

Patryk Wasiak
University of Wrocław (P)
Patryk Wasiak is Lecturer at the Institute for Cultural Studies of the University of Wrocław in Poland. He holds an MA in sociology and art history from Warsaw University and a PhD in cultural studies from the Warsaw School of Social Sciences and Humanities. His PhD thesis was on transnational contacts of visual artists within the Soviet bloc, and he has also done research on social aspects of computerization in socialist Poland. He has received fellowships from the Volkswagen Foundation, the Zentrum für Zeithistorische Forschung Potsdam, the Netherlands Institute of Advanced Study, and the Andrew W. Mellon Foundation. His research interests include the cultural and social history of the Cold War. He is also an affiliate of the 'Tensions of Europe: Technology and the Making of Europe' research network.

Research Group
The Future in the Stars:
European Astroculture and Extraterrestrial Life in the Twentieth Century
Emmy Noether Research Group
Friedrich-Meinecke-Institut
Freie Universität Berlin
Koserstrasse 20
D-14195 Berlin
www.heavens.geschkult.fu-berlin.de
astrofuturismus@fu-berlin.de

Phone Numbers
Alexander Geppert +49 (178) 8181270
Daniel Brandau +49 (176) 34402860
Tilmann Siebeneichner +49 (152) 05996701
Henry Ford Building +49 (30) 838 54250

Venue
Henry Ford Building
Garystrasse 35
D-14195 Berlin
www.fu-berlin.de/en/sites/hfb

Bars
Luise, Königin-Luise-Strasse 40–42,
14195 Berlin

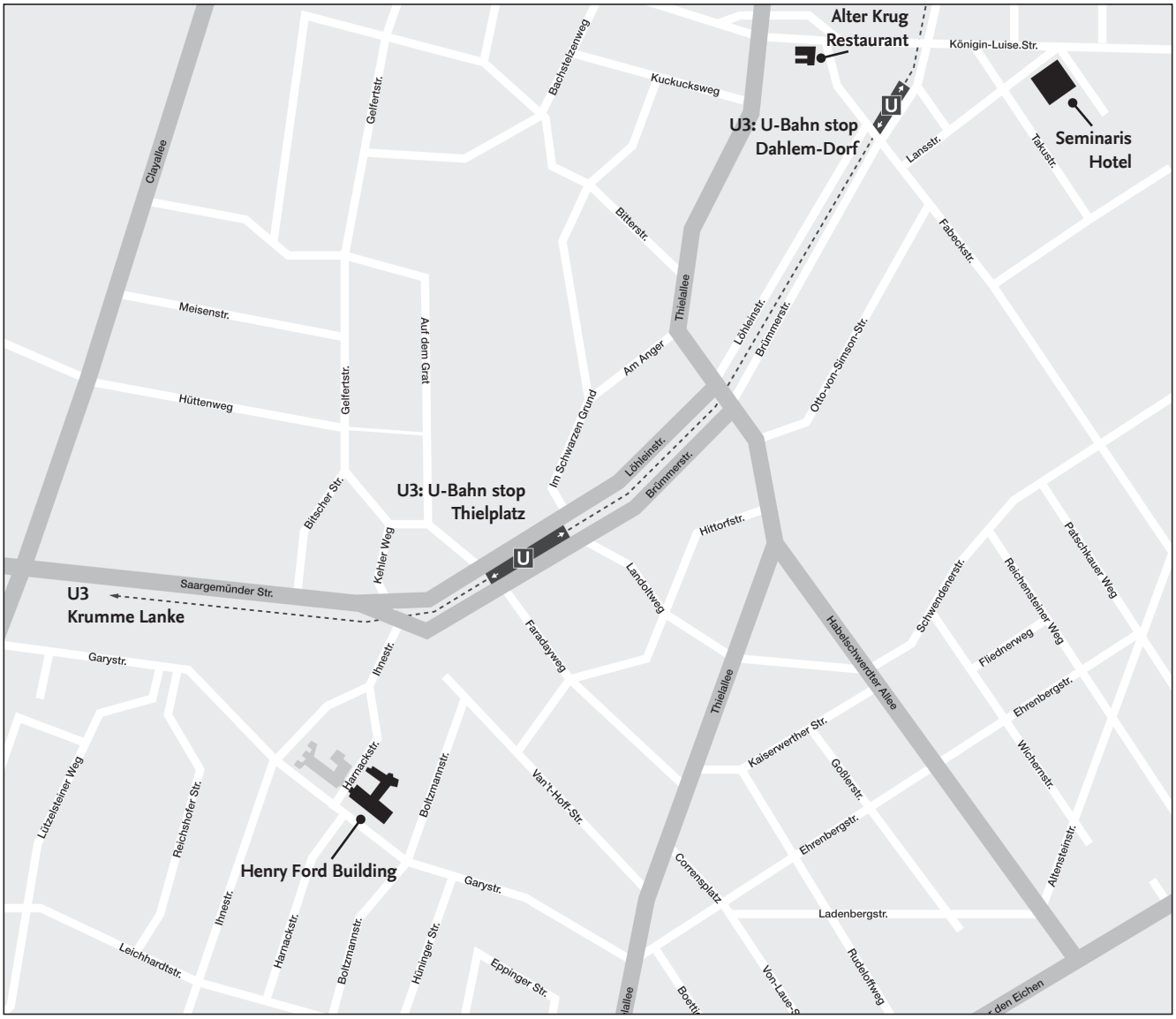
Convenience Stores
Kaiser's, Königin-Luise-Strasse 37, 14195 Berlin
(Mondays to Saturdays, 7.00 a.m.–10.00 p.m.)

Newsagents
Lotto, Königin-Luise-Strasse 39, 14195 Berlin

Restaurants
Alter Krug, Königin-Luise-Strasse 52,
14195 Berlin (U-Bahn Dahlem Dorf, line U3)
Gasthaus Landauer, Landauer Strasse 8,
14197 Berlin (U-Bahn Rüdesheimer Platz,
line U3)
Heuberger, Gotenstrasse 1, 10829 Berlin
(U-Bahn Kleistpark, line U7)

Transportation
U-Bahn Thielplatz (line U3)
S-Bahn Lichterfelde (line S1)
(15 minute walk from either stop to the Henry Ford Building)
The website of Berlin Public Transport (BVG) contains more information and provides a route calculator (*www.bvg.de*).

Wi-Fi
Wireless connection to the internet is available for free at the Henry Ford Building. Participants may also access the internet via their Eduroam account.



Freie Universität Berlin, Center for Digital Systems

www.heavens.geschkult.fu-berlin.de
astrofuturismus@fu-berlin.de

The Future in the Stars