



## **Syllabus for GST 432**

### ***To Boldly Belong: Environmental Stewardship and Space Exploration***

**Winter Term 2013**

**1:30 pm – 4:30 pm Monday - Friday**

**Dr. Martin C. Fowler**

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**Background:** Perhaps it is no cultural coincidence that environmental stewardship and space exploration sprouted and thrived side by side over the past fifty years. They have grown in different directions but are rooted in the same idealistic future-positive and life-cherishing values. To use a different metaphor, both enterprises have channeled science into the fast-moving cultural rapids of mission. Within science's larger calling to know, explain, and predict the dynamics of nature, these quests send inquiry, exploration, and global consensus cascading toward saving the Earth or exploring space. Tree-huggers and rocket boys usually work, plan, and lobby for support in isolation from each other, virtually (if not literally) on separate worlds. Occasionally, a mission goes awry and a toxic payload appears on environmentalists' radar as it plummets from the sky. But waiting for an emergency as pretext for dialogue about shared values is like siblings waiting for funerals as pretext to visit each other. Yes, space exploration's appetite for exploring the unknown does not mix easily with environmentalism's ethos of prudence, sustainability, and care. But they have so much to catch up on! Besides, we're asked to endorse, pay for, and identify with these two crusades. Which quest should we choose? Or can we imagine these causes as two sides of the same quest?

Required texts:

1. *Space Chronicles: Facing the Ultimate Frontier* by Neil deGrasse Tyson (2012)
2. *Choice, Not Fate: Shaping a Sustainable Future in the Space Age* by James A. VEDDA (2009)
3. *Every Living Thing: Man's Obsessive Quest to Catalog Life, from Nanobacteria to New Monkeys* by Rob Dunn (2010)
4. *Mobilizing the Green Imagination: An Exuberant Manifesto* by Anthony Weston (2012)  
New Society Publishers ISBN 978-0-86571-709-1
5. *Genesis – An Epic Poem of Terraforming Mars* (1992, 2012)

Recommended Reading:

1. *The Case for Mars* by Robert Zubrin (2010)
2. *Thriving Beyond Sustainability: Pathways to a Resilient Society* by Andres R. Edwards (2010)
3. *The Sustainability Revolution: Portrait of a Paradigm Shift* by Andres R. Edwards and David W. Orr (2005)
4. *Terraforming: The Creating of Habitable Worlds (Astronomer's Universe)* by Martin Breech (2009)

Neil deGrasse Tyson argues in *Space Chronicles* that the “ultimate frontier” as shared quest will stimulate new science and pipeline future scientists inspired by this quest. In contrast, James Vedda, in *Choice, Not Fate: Shaping a Sustainable Future for Space Exploration*, maintains that it is wrong to continue focusing on destinations (e.g. “put a man on Mars”) but that space exploration should develop capabilities which bring direct benefits to Earth while enabling exploration of the solar system. Rob Dunn, in *Every Living Thing*, reminds us that life on Earth remains unexplored in many ways. Cataloging, seeking out, discovering, and finding life anew humbles any generation which imagines itself possessing a complete and definitive knowledge of life on Earth. Finally, Anthony Weston, in *Mobilizing the Green Imagination*, guides us to imagine an exuberant environmentalism which embraces other species and other worlds.

**Course objective and goals.** The objectives for this winter term course are as follows:

1. This course requires students to research and write about the rationales and prospects for environmental stewardship and space exploration. Students will identify and evaluate shared values, values in tension with each other, and values which seem mutually incompatible in these two quests. For example, both quests are dedicated to designing habitats compatible with human needs and a surrounding environment but with starkly different environments in mind.
2. This course requires that students also formulate insightful questions, through research and in-class discussions, which arise from considering both science-quests and their vision of a possible and desirable future.
3. Students will consider larger questions of environmental stewardship and space exploration as dramatized in Frederick Turner’s epic poem: *Genesis*.
4. At the end of the course, students will debate what may seem science-fiction speculation: *Should Mars be terraformed?* However, forming and presenting arguments about this environmental question, especially after reading *Genesis*, will inspire a deeper appreciation for the values at stake in creating sustainable environments anywhere. The final exam will allow

students to debrief from their debate and to write about the philosophical issues they found most interesting in both quests: environmental stewardship and space exploration.

**Writing assignments and Grading.** During the winter term, students will begin with values which environmental stewardship and space exploration seem to share: the capacity of humanity to shape its future relationship with the Earth in a global mission (what William James once called “the moral equivalent of war”), and a commitment to the intrinsic value of life.

*Moodle open forum (25 points):* Students will submit brief summaries and critical responses to different chapters of the texts we study. Students will then view and comment upon each other’s summaries and responses. Although students will not have access to grades for other students or my comments to individual students, they will be both *peer-reviewed* and *peer-reviewing* scholars for the semester.

*Facilitating and participating in class* discussion of chapters summarized and reviewed by the class. Different groups will take responsibility for this for each class session (25 pts.) Often the discussion will begin with a single question (e.g., Is life worth the cost of finding it?) They will write up questions prior to the discussion and write questions resulting from the day’s discussion.

*Quest Research Paper* 25 pts. Students will write this research paper in preparation for their debate, using the course texts *and citing each other’s Moodle open forum summaries and reviews*. They must also make use of sources cited by the text authors, find useful websites about terraforming Mars, and participate in an online discussion of terraforming issues.

*Debate:* 25 pts. Students will complete the course by participating in a public debate which brings together environmental and space exploration quests in a single question: *Should Mars be terraformed?* They will discover that there is already a thriving community of discourse about this issue, and they will participate in that discussion in preparation for their debate.

This debate will be in a public setting at Elon, with invited evaluators from space science and environmental science. The evaluators will have the opportunity to cross-examine and ask questions of the debate teams and will decide who wins the debate.

*Final Exam:* 25 pts. The final exam will allow students to debrief from the debate and to present their arguments at length and in more depth than in a debate setting.

### **Course Calendar:**

Thursday, January 3, 2013 <i>Space Chronicles</i> , Part I: Why (pp. 21-63) <i>Every Living Thing</i> , Part 1: Beginnings (Prologue and pp. 3-20)
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Friday, January 4, 2013:

*Genesis*, Act I: The Origins of War

*Mobilizing the Green Imagination*, Ch. 1 “Where is the Vision?” and  
Ch. 2 “Other Worlds are Possible”

Monday, January 7, 2013:

Read: *Space Chronicles*, Part I: Why (pp. 64-106)

*Every Living Thing*, Part 1: Beginnings (pp. 21-58)

Tuesday, January 8, 2013:

*Space Chronicles*, Part 2: How (pp. 107-190)

*Every Living Thing*, Part 2: Fogging (The Tree of Life) (pp.59-132)

Wednesday, January 9, 2013:

*Genesis*, Act II: The Trial of Chance

*Mobilizing the Green Imagination*, Ch. 3 “Way Beyond Recycling” and  
Ch. 4 “After Transportation”

Thursday, January 10, 2013:

*Space Chronicles*, Part 3: Why Not? (pp. 191-252)

*Every Living Thing*, Part 3: Roots (pp. 133-192)

Friday, January 11, 2013:

*Genesis*, Act III: The Mutiny of the Gladiators

*Mobilizing the Green Imagination*, Ch. 5 “Adaptation with Sass”

Monday, January 14, 2013

*Choice, Not Fate* Ch. 1 “Cruising to Utopia – or Not” and

Ch. 2 “Searching for a Vision of the Future”

*Every Living Thing*, Part 4: “Other Worlds” (pp. 193-256)

Tuesday, January 15, 2013:

*Choice, Not Fate* Ch. 3 “Muddling Through with a Short-Term View” and

Ch. 4 “The Bureaucracy: Best Hope for the Future?”

*Genesis*, Act IV: The Gardening of Mars

*Mobilizing the Green Imagination*, Ch. 6 “A More-Than-Human-World” and

Ch. 7 “Fellowship with Animals”

Wednesday, January 16, 2013:

*Genesis*, Act V: The Words of the Sibyl

*Mobilizing the Green Imagination*, Ch. 8 “The World’s Great Liturgies?”

Thursday, January 17, 2013

*Choice, Not Fate*, Ch. 5 “Astropreneurs: The Real Vision or Just a Dream with Good Special Effects?” and Ch. 6 “Be Careful What You Wish For”

Friday, January 18, 2013:

*Choice, Not Fate* – Ch. 7 “Earth as an Open System”

*Mobilizing the Green Imagination*, Ch. 9 “To the Stars”

**Quest Research Paper Due!**

**Monday, January 21 – Martin Luther King Day – no class today**

Tuesday, January 22, 2013

*Choice, Note Fate* – Ch. 8 “The Century Perspective” and

Ch. 9 “Commitment to the Future”

Wednesday, January 23, 2013

**Class Debate: Should Mars be Terraformed?**

Thursday, January 24, 2013: Final Exam