

## UH Students Settle on Mars!...and other adventures from the future.

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As some of you may know, I've been here at the University of Hawaii for almost 30 years. During that time, I've seen many ups and downs in the condition of the University, but none have been more devastating than those ongoing now for almost a decade--though I suspect that a lot more wanton destruction of this unique and fragile global treasure lies ahead.

As a futurist, I view all of this with mixed feelings. On the one hand I am happy and proud, because I have been forecasting the demise of publicly-funded higher education for many years. What is happening is all part of the plan as I have foreseen and foretold it.

On the other hand, I am angry and disappointed with myself because I have been unable to prevent it from happening--I failed to get others--to get you--to see what was, to my eyes, very plainly lying ahead, and to do something about it. But no, we--each and every one of us--diverted our attention to other, much more trivial, things. Instead of looking ahead with vision and courage, and then acting to preserve and transform this communal/global treasure, we turned inward and private. We chose to shop till we dropped.

I love this place. In fact, when I die, even though I have given strict instructions against anyone holding any kind of a ceremony, if one were to be held against my wishes, I would like to have the UH Alma Mater sung over my ashes, with special attention being given to the line which refers to her "freely offered stores."

In green Manoa valley our Alma Mater stands.  
Where mountain winds and showers refresh her fertile lands.  
The flag of freedom beckons above her shining Walls.  
To wider truth and service our Alma Mater calls.

Hawai'i, we have gathered within thy wide flung doors,  
As sons and daughters claiming thy freely offered stores.  
Our loyal praise we tender, and pledge to hold thy aim,  
Till oceans' far horizons shall hear thy honored name.

Once upon a time, I was especially proud of the fact that almost any qualified person could attend UHM because the tuition was so low--truly "wide flung doors" with "freely offered stores". Now, whenever I sing the Alma Mater, I choke on the phrase because of the hypocrisy. I am utterly opposed to all of the recent tuition increases which are just so many more nails in the coffin of what was once a progressive, sharing and caring community called Hawaii.

On the other hand, I have "pledged to hold my aim till oceans far horizons shall hear her honored name." Indeed, her name has been well heard around the world. It makes me very proud to be able to represent the University of Hawaii at so many national and international venues. I remain amazed that the University is held in such very high esteem in every corner of the world, overwhelmed by the respect

accorded this University--everywhere but here.

I have frequently said that the University of Hawaii is a much better university than the State of Hawaii deserves.

Now by that, I don't mean that the people of Hawaii are undeserving of the world class university that they have. Quite to the contrary. They are thoroughly deserving of it. They should have one even better, and its doors should be flung even more widely open and our stores of knowledge be distributed as freely as they possibly can be. All of the people of this community deserve that.

But name for me, please, one other community of only a million people, thousands of miles from any other people, that had the vision and courage to try to create a university as great as the University of Hawaii is--or, even more clearly, was.

The University of Hawaii was built from the beginning on a vision much bigger than its base. The University fails, falters, and seems about to fall because it is expected to do so much. But it does what it is asked to do, and more. With every uncaring budget cut and insult, the faculty try to give this community a better university than it deserves--if we were to create a university which could be fairly supported by a community of only one million insular souls.

Consider all of the things that UH is truly and deservedly famous for, which are always featured in any official statement about the University, or which appear in every newspaper editorial which tries to sing, however faintly, the praises of UH: It is always the same list of suspects--astronomy, oceanography, Asian and Pacific languages and cultures, belatedly (embarrassingly so for a school that calls itself the "University of Hawaii") Hawaiian studies. That's about it. Someone might mention the Business School nowadays since global capitalism is all the rage. Someone else might mention the Law School, named after one of the most truly visionary and honorable persons in contemporary Hawaii, William S. Richardson, though with every rise in national standings which the Law School achieves, it moves just that much farther away from the reason the law school was originally and properly created. And then there is the Medical School which also has had its splendid moments, though it has often had to struggle to live up to the high moral principles and vision of the person for whom it was named.

But who am I to talk, within a Department within a College housed in a building honoring a person named "Porteus"?

Indeed, we should all take a moment now for silence, sitting as we are, in Krauss Hall, named for Frederick Krauss, but as properly named for Beatrice Krauss who finally let herself to move on to other ways of being just a few weeks ago.

But this evening, I want to talk about one of the things for which UH is better-known globally than it is locally--studies in the human settlement of space; what Professor Ben Finney of the Department of Anthropology--and the person who should more properly be here making this talk instead of me--calls the cosmicization of humanity: humanity becoming one with the cosmos, and the cosmos experiencing and transforming humanity.

As I said, UH is very well-known locally and globally for its magnificent astronomy department, and especially its astronomical observatories on the Big Island. We also

have many world class scientists working with NASA and other space agencies and industries on the exploration of the moon, Mars, the solar system and beyond. Whenever a journalist seeks a quote about life on Mars, or on the moons of Jupiter, or any other technical or scientific aspect of astronomy and planetary science, it is very likely that journalist will seek a quotation from someone at the University of Hawaii.

We should be very proud of this. And I think we justifiably are.

As Prof. Deane Neubauer reminded us recently, over a century ago, the United States Congress wisely chose to encourage the states to allocate substantial amounts of land and money for the scientific advancement of agriculture and industry. They created the so-called "Land Grant" universities. Almost every university which has the word "state" in it (such as Michigan State, or Ohio State, or Pennsylvania State, or Kansas State University (and many universities, such as the University of Hawaii which do not have the term "state" in their name) are all land-grant universities. America would not be the great nation it is without the research, teaching and outreach of its land-grant universities

Then, several decades, ago, recognizing the growing importance of the oceans and of ocean science, Congress established a smaller number of "Sea-Grant" universities. And the University of Hawaii is a Sea Grant university too, you certainly know.

Even more recently--and with the encouragement of one the greatest gifts Hawaii ever made to far-sighted and visionary governance--Senator Spark Matsunaga--Congress created a few Space Grant Universities.

The University of Hawaii is one such university, and I hope you all have visited the office of the Planetary Data Center in the basement of Sinclair Library and have attended the lectures, symposia, and other activities of the Space Grant Program, which include impressively extensive outreach in the primary and secondary schools of Hawaii, encouraging our citizens of the future to consider space to be an exciting and viable arena for their own dreams, aspirations, and efforts.

For example, several months ago, some school children in Hawaii, from eight to ten years old, engaged in a project concerning the planet Mars which won a national prize. The students were from one of the most economically-disadvantaged areas of Honolulu. Many of them had come to Hawaii only recently--being themselves explorers in a new and alien land.

According to newspaper accounts, when you listened to the children talk about their Mars project, you heard Vietnamese, Laotian, Cambodian, Mandarin, Cantonese, Ilocano, Samoan, Tongan, Korean, and Marshallese, as well as English and Hawaiian.

Whatever was their language, the reporter said that they expressed unbounded optimism and enthusiasm for a journey to Mars.

That vitality is clearly expressed in the words of an anthem they composed for their Mars settlement. The lyrics say:

Mars, the world that makes us realize our dream.  
As we seek a better world  
Bringing hope to boys and girls  
It is the power of the dream that brings us here."

So, what do you think? What do you feel about a journey to Mars--if not for yourself (unless you are a John-Glenn kind of guy), at least for your children and grandchildren?

Does such talk of space sound old-fashioned to you--something that American school children used to dream about years ago, but no more? Are you amazed to hear that young people are still enchanted by space; willing to believe it is a desirable and genuine option in their lives?

Many Americans act as though space were dead. *Passé*, gone with long hair and peace signs. A symbol of America's immature adolescence; before it grew up and did manly things like portfolio managing and money marketing and otherwise spending the weekend sitting on their beepers.

Anyway, think about it. Assume that space is indeed dead; that, in fact, as shuttles explode or just simply corrode away in the Florida humidity, no new ones are built. And assume, as seems all too likely, that it turns out to be impossible to build the International Space Station because of continuing cost overruns and political squabbles.

So, instead of continuing to boldly go, humanity comes to its senses and decides to just stay put; to just say "no" to the folly of the cosmos; to turn its attention ever more diligently to the vastly more demanding tasks of producing and selling more flavorful chewing gum, more cleverly deceptive hair transplants, or whatever it is that beeper sitters sell or do.

Some will also argue that, instead of wasting money on "moondoggles" we should address the problems of social injustice, poverty and malnutrition. Or perhaps even the uncertain challenge of global warming and sea level rise.

But as I understand the mood of the moment, we are not about to spend money on social injustice, solving poverty, malnutrition or global warming except by spending more money on chewing gum and hair transplants, in the belief that it is through the creation of more jobs so that people can do more manini things with their lives, that sea level rise will raise all boats to higher levels of GNP and personal wealth.

And that mythology--that wholly unsubstantiated ideology--is so fixated in the minds of most people in the world today as to seem impervious either to arguments from reason or lessons from experience.

So, contemplate this. 100 hundred years, 200 years hence, humanity remains rooted to the Earth, seldom gazing skyward at all except to wipe the honest sweat from its laboring brow.

Once in a while, some one points out, in some obscure history book, that humans once stepped foot on the moon, indeed played golf there for a spell.

But never again.

What could have possessed us to have done that? Why in the world did we feel it was necessary to beat the Russians to the Moon? What did it get us that can bought and sold except a few photographs of the frail Earth shimmering insubstantially above

the strange horizon of a barren moon?

Crazy. Right up there with building the pyramids or composing symphonies--human acts with no bottom line, with no good economic pay-off.

But wait. Wait!

There IS money to be made in space. Lots of it. It is just that letting a huge governmental bureaucracy like NASA be in charge of space exploration is the mistake. NASA can do some of the basic research, but the exploration and exploitation of space should be left to the private sector. So back off, NASA, and let the good times flow.

There are resources in space, jobs in space. Everything from mining to tourism awaits us. People are already being buried in space, and the ashes of one brave space scientist will soon be spread on the surface of the Moon.

If the dead are willing to go into space for the fun of it, can the living be far behind?

There are already scores of people figuring out how to make a buck in space. Perhaps you have heard of the X Prize, which is being offered from an outfit headquartered in St. Louis.

St. Louis, you ask? Why there?

Because that is exactly where Charles Lindbergh created history and changed the world by accepting the challenge, and seeking the cash prize, of being the first human to fly solo across the Atlantic.

The X Prize is now being offered to the first individual who can achieve similar specified goals in space, eventually landing on the Moon, and then, perhaps on Mars.

So, why wait for NASA? Why leave it to a stifling bureaucracy? Harness human ingenuity, enterprise and adventure. Give us enough incentives, and release us from shackling regulations, and we will be in space in no time.

Well, it is one thing to entice people to sail from Europe to the so-called New World several hundred years ago--as dangerous and uncertain as that journey was--and it is another thing to ask a person to fly an airplane across an ocean.

But space is something else entirely different. In the ocean and even in the sky, there is air to breathe. Gravity pulling you down. Wind pushing you forward. There are fish in the sea and water falling from the skies. It may be tough, difficult, challenging, but it is Earth. It is still our nourishing if sometimes harsh, Mother Earth.

But space? How can we survive there? It is not just a matter of deciding to go and going. That was the stuff of early science fiction before we really knew what was out there, and how much is not there.

Space exploration and settlement will not be done by solitary entrepreneurs, however valuable they might be in some individual, dangerous, and inspiring adventures.

It takes organization, cooperation, and lots of money and people.

But compare air flight in Lindbergh's time to air flight now. Isn't that just the point? The first steps are by daring individuals, but then as more and more people become involved, what was once daring, expensive, and rare becomes safe, cheap and routine. The shift from Lindbergh flying nonstop to Paris, to Japanese tourists flying nonstop to Kona is enormous, and rapid.

So also will be the movement from the First Man on the Moon to you or your children booking passage on "Singapore Spaceways" to spend a few weightless weeks in the fabulous Lunar Hilton Hotel, soon to be renamed the Lunar Mandarin.

This is not as fanciful as it seems.

In order to bring it into clear focus, don't concentrate on what is happening, or not happening, in space here in America. Look at what is happening in other countries and cultures, where space remains a much higher priority than it is here. In Russia, of course, and in Europe, where the European Space Agency continues to move, if unsteadily, ahead.

But in Brasil, in India, and certainly in Japan and China.

The space program in the US may be tired, old and gray, but it is vigorous and young elsewhere. And even if it is tired and old in the US, there are young Americans who also want to refocus and revitalize it here. But they wisely know that space exploration and settlement is not something which can or should be done by one nation alone. It is a truly human, truly global, truly multicultural and multidisciplinary activity.

About fifteen years ago, three young American graduate students at the Massachusetts Institute of Technology had a dream. In the midst of the coldest days of the cold war, when space was again alive in the US, but solely as a military venue--a place for Star Wars and Shining Pebbles, and weapons-related space installations on Haleakala and elsewhere--three young men had a dream which was not of the militarization of space, but of its peaceful use and settlement by and for all humanity.

And so they set about creating an institution which will enable humanity to move into space, holistically, safely, humanely, even romantically, by the mid point of the 21st Century and beyond.

They envisioned the creation of an International Space University--an institution of higher learning where people from all of the space agencies, space industries, and space-related research and teaching institutions of the world, in all disciplines from rocketry and space medicine to religion, ethics, philosophy, and science fiction, could come together, share their knowledge, ideas, and aspirations, and slowly create a cadre of scientifically-trained, technically-competent, ethically-informed and spiritually-motivated, and culturally-diverse humans who would be in such positions of power, influence, and control that they could help urge and direct humanity to leave its cradle, Earth, and begin to take its rightful place among the myriad of planets and particles of, first the inner solar system, then the entire solar system, and eventually into the vast cosmos itself.

And these three young men made their dream come true. There exists now an International Space University. Its headquarters are presently in Strasbourg, France, determined after an extensive competition among many nations of the world.

For more than ten years, the ISU has held ten week summer sessions in various spots around the world--First Cambridge, Mass., then Strasbourg, France; Kita Kyushu, Japan; Huntsville, Alabama; Barcelona, Spain; Stockholm, Sweden; Vienna, Austria; Houston, Texas; this summer in Cleveland, Ohio, next summer in Thailand. After that in either Brasil, Argentina, or China.

On the main campus, a year-long Master's degree-granting program in Space Studies is now in its third year.

The Academic Departments of ISU are the following ten:

- Space Systems Architecture and Mission Design
- Space Business and Management
- Space Engineering
- Space Life Sciences
- Space Policy and Law
- Space Resources, Robotics and Manufacturing
- Satellite Applications
- Space Physical Sciences
- Space Informatics, and, finally
- Space Humanities, or what is now called "Space and Society"

On April 12, 1995, the three Founding Fathers of ISU, Peter H. Diamandis, Todd B. Hawley, and Robert D. Richards, proclaimed the ISU CREDO:

WE, THE FOUNDERS of the International Space University, do hereby set forth this Credo as the basis for fulfilling ISU's goals and full potential.

INTERNATIONAL SPACE UNIVERSITY is an institution founded on the vision of a peaceful, prosperous and boundless future through the study, exploration and development of Space for the benefit of all humanity.

ISU is an institution dedicated to international cooperation, collaboration and open, scholarly pursuits related to outer space exploration and development. It is a place where students and faculty from all backgrounds are welcomed; where diversity of culture, philosophy, lifestyle, training and opinion are honored and nurtured.

ISU is an institution which recognizes the importance of interdisciplinary studies for the successful exploration and development of space. ISU strives to promote an understanding and appreciation of the Cosmos through the constant evolution of new programs and curricula in relevant areas of study. To this end, ISU will be augmented by an expanding base of campus facilities, networks and affiliations both on and off the Earth.

ISU is an institution dedicated to the development of the human species, the preservation of its home planet, the increase of knowledge, the rational utilization of the vast resources of the Cosmos, and the sanctity of Life in all terrestrial and extraterrestrial manifestations. ISU is a place where students and scholars seek to understand the mysteries of the Cosmos and apply their knowledge to the betterment

of the human condition. It is the objective of ISU to be an integral part of Humanity's movement into the Cosmos, and to carry forth all the principles and philosophies embodied in this Credo.

THIS, THEN, IS THE CREDO OF ISU. For all who join ISU, we welcome you to a new and growing family. It is hoped that each of you, as leaders of industry, academia and government will work together to fulfill the goals set forth herein. Together, we shall aspire to the Stars with wisdom, vision and effort.

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Why am I telling you so much about ISU? Not only because it is a very important ingredient in the mix that will eventually get humanity fully into space, but mainly because the University of Hawaii has been very actively involved in ISU from the very beginning.

First of all, students from the University of Hawaii have attended the summer sessions of ISU, and I wish financing were available to send more. It is an incomparable intellectual, spiritual, and personal experience for everyone who attends.

Moreover, for a brief while, some folks at UH flirted with the idea of putting in a bid to be the host main campus for ISU. Can you imagine what it would mean to Hawaii, now and for the future, if we can go forward with that, and if Hawaii, instead of Strasbourg, France, were the site of that main campus, bringing space-oriented people from all over the world to study and lecture here? Putting Hawaii at the very center of the universe in the exciting mission which will launch humanity into the solar system and beyond?

Well, that did not happen. But ISU also has a series of what it calls "Affiliate Campuses"--space-related academic and research institutions around the world.

And the University of Hawaii is an Affiliate Campus of ISU now. Rather, the Hawaii Research Center for Futures Studies, which I direct, is an Affiliate of ISU, and I very much hope the time will come when the University per se will become affiliated. Given our resources at UH, it is utterly ludicrous that my Center, and not the UH in all its space grandeur, is the designated affiliate. But I see my Center as merely a placeholder until UH gets its act together again.

You see, there is no single place in all the world that has a richer array of varied space-oriented academic and research programs than does the University of Hawaii. Indeed, some people would argue that we already ARE the real "International Space University," and that the one in France is merely a pretender.

I would have to say that is not the case. Our space community here remains divided, splintered, factious. And, in the climate of budget shortfalls and vertical cuts, rather than hanging together for mutual support and enhancement, I am afraid we are pretty much hanging separately.

But how did the Hawaii Futures Center become an Affiliate of ISU?

I mentioned that one of the Departments of ISU is Space Humanities, or what is now called "Space and Society."

That is our connection.

It turns out that the University of Hawaii has more space-oriented humanists and social scientists than any other university or research center in the world. While there are only three or four of us, that is still more than anywhere else!

The leader of the pack--the person without whom there would be no global recognition of space humanity at all--is Ben Finney in the UH Department of Anthropology.

As I am sure many of you know, Ben is a leading figure in the revival of Polynesian voyaging, and the world's most outstanding scholar of the history of that voyaging. He is a specialist on the human inclination to explore, expand, grow, inquire, not only of the Polynesians, but of many other human groups.

But especially of the Polynesians, because, once upon a time, the people of these islands were master sailors and explorers, boldly going indeed where no one had ever gone before. And going with their families and friends and dogs and hogs, and provisions and beliefs. Boldly sailing where no one else indeed dared sail. In pursuit of a dream, an ideal, a belief. A place, a mystical, visionary, wonderful place called, "Hawaii."

Unfortunately, they convinced themselves they found it, and settled down.

It is my hope and dream that the peoples of these islands now--all of them--can rekindle humanity's inquisitive spirit--instead of our acquisitive spirit--and lead us from Hawaii to the stars--or, more truly, to the "Hawaii" in the stars.

That was also a dream of Sen. Matsunaga, whose book, The Mars Project, is still a stunning challenge to all of us, and whose work on the United Nations International Year of Space, only shortly before his death, is also a beckon of challenge and hope.

So, when NASA wanted to know about long-ranged voyaging they had only one place to turn, to the University of Hawaii and to Ben Finney.

Ben has done an enormous amount of writing, speaking and consulting on this theme. As I say, it is he who should be here tonight instead of myself.

When ISU inaugurated its first summer session in Cambridge, Mass in 1989, it was only natural that they would invite Ben to be the major lecturer on space exploration and the human spirit. Similarly, when ISU decided to establish a permanent department of Space Humanities, it was only natural that they would ask Ben Finney to head it, which they did.

But there is another person here who ranks with Ben as a world class space humanist. That is Prof. David Swift in the Department of Sociology of UHM. David has also consulted extensively with NASA and written widely about the human side of space exploration, including why so few scientists seem to believe that Earth has been visited by Extra Terrestrial beings, while so many ordinary citizens seem to hold that belief, while so many scientists support as credible and important the Search for Extra Terrestrial Intelligence (SETI, as in the recent Jodi Foster film by Carl Sagan, called Contact) while so few ordinary citizens seem to care for SETI at all.

Dave Swift has also recently completed a fascinating book called Voyager Tales which

is based on extensive interviews with the people who planned, launched, and subsequently tend the two Voyager spacecrafts--the first artifacts of humanity which have visited, if only briefly, all of the planets in our solar system, and now, with messages of greeting from humanity to whomever they might encounter, are streaking across deep space on journeys which might well last for eternity.

I am a bit player in this saga as well.

As some of you know, I am primarily concerned with the future. The future of everything and anything.

I am of course especially interested in space exploration and settlement, which is certainly a future-oriented subject, if it is anything, since it is so recent, rare, and fragile a human activity now.

But that does not qualify me for anything, except being an amateur, perhaps like many of you in this room.

But I am a political scientist. And I have for two decades been teaching undergraduate as well as graduate courses on political design--the envisioning and design of new political institutions.

I find that envisioning, much less actually designing, new and effective systems of governance to be a very difficult thing for most people to do, me included.

Few of us have been trained, or even encouraged, to look upon our world as an invention--something which some humans have invented, and which we now must re-envision and re-invent.

I try to help people acquire that attitude and the skills necessary to make it come true.

One problem has been that, while most people are depressingly uninformed about the past and present of their political system--why it is as it is, and indeed what it is in reality--they do have a lot of myths and false beliefs about the past and present which they carry with them when they think about governance in the future.

So I have had to try to find ways to shake those hampering false beliefs out of them.

Several years ago, I came up with the idea that one thing I could do would be to get them off of the Earth and to some place that had no history to bog them down.

After trying the Moon and various so-called L-5 locations where orbiting artificial space communities might be created, I decided to ask them to design a governance system for Mars. A system not for the period of initial exploration and settlement, but later, when Mars is being settled by ordinary women and men--or at least by the kinds of women and men who have shown a willingness, if not indeed an eagerness, to get up and move to new and hopefully better places in the past.

Now that in itself is a dangerous and problematic thing to discuss, much less encourage, in this day and time. What is often seen as the natural human urge to explore is now properly seen by many people as an impulse to conquest, exploitation, domination, colonialism, slavery and genocide.

And/or it is seen as something that men do, especially at certain periods in their lives when testosterone is in full control of their bodies and minds.

Exploration is not something humans do. It is something men do, some people--generally not men--argue. Women sit at home, or network with each other, taking care of things. Women don't routinely run around rampaging and ravishing like many men seem to do.

I'm sorry I brought it up. I can only get myself into big trouble here. But it is part of the problem nowadays. The historical record seems pretty clear, whatever may be the case from human nature and biology, or from human nurture and the environment.

That is one reason I always try to talk about "space settlement" and not "space colonization"--even though there appears to be no life, much less any intelligent life, anywhere in the immediate neighborhood, for humans to colonize, dominate, exterminate.

But that really doesn't get us off the hook, does it? That doesn't justify our occupying space.

Take for example Mars.

So far, there is no clear evidence that life ever existed on Mars (although I believe it is likely we will eventually find that it did) much less that life exists there now. And certainly there is no intelligent life on Mars at this point.

So it might be said that concerns about colonization and domination are moot in this case.

But some folks are arguing otherwise.

For example, one of the plans some people have for Mars is called "Terraforming"--making Mars as Earthlike as possible as quickly as possible so that humans can live there in conditions as close to those of Earth as they can make it.

Terraforming would be a very impressive feat of engineering--beyond the scope of anything humans have ever tried on Earth. For that reason alone, I find it tremendously exciting. And the possibility of making Mars as inhabitable as Earth, through terraforming--well that is breath-taking (or, more truly, breath-giving).

But should we try to terraform Mars? Not only would it take a lot of money, which many people feel we do not have, or should not spend on such ventures, but others also argue that the history of mega-engineering projects on Earth clearly indicates that there is always an unanticipated downside. We are sure to foul up in many ways we haven't yet even thought of.

I find an even more interesting argument against terraforming to be that "rocks have a right to be left alone." If "trees have standing," as some lawyers have argued, why don't rocks also have standing in law suits against undesired human action? And anyway, by what right do we humans--who are messing up our own home so royally--believe it is OK to mess up Mars as well?

Leave Mars alone, many people feel. Treat Mars as a preserve (as we do Antarctica for example) available for nonintrusive scientific exploration, and maybe a tiny bit of tourism, but never for settlement, much less for terraforming.

These and related questions have now been debated by several years-worth of undergraduate students at UH. I have asked them to design a governance system for a settlement on Mars--after Mars has been initially explored by robots and brave humans, and it has now become a place where ordinary humans might chose to go--for all of the many reasons humans have chosen to pack their bags and set out on dangerous voyages to places unknown or misunderstood.

My charge has been for the students to determine how people might choose to behave if they can behave however they wish, or, to put it a different way, to determine what kind of a culture people might like to create if they can create any culture they want.

What might they choose from the past--not only their own past but that of all cultures that have ever lived, whose memories we still hold in reality as well as in fantasy?

What might they choose from the myriad of cultures around them now?

And what new ways might they wish to invent?

How might people behave if they can express that behavior in a completely new environment--one which is different from Earth in every way. As you all probably know, Mars presently has no breathable atmosphere, not enough atmosphere to protect humans from solar UV rays, solar flare protons or cosmic radiation, no trees, no standing water, no apparent life forms of any kind, no magnetic field, one third the gravity of Earth, half the amount of surface sunlight, the same four seasons, but each twice as long as on Earth. However, the temperature is so cold that it is really a perpetual winter and worse. The only thing that is basically Earthlike is that the Martian day is ever so slightly more than 24 hours long.

Now all those differences are truly liberating when it comes to political design. So much of what we assume about governance--and culture in general--on Earth is shaped by the environment of Earth. Some people believe in "natural law," and further believe that the laws of men are, or should be, made in harmony with the laws of nature. That was the explicit belief of the Founding Fathers of the US Constitution over two hundred years ago.

Well, there is a very different nature operating on Mars, it seems. Of course, the same underlying physics exists, but the way it plays out on Mars seems strange and "unnatural" when compared to Earth.

And so we are, or should be, free to imagine new and different forms of culture on Mars, if we can just let go of our Earthly bounds and limitations, and grasp what Mars permits and requires instead.

As I said, quite a number of UH students have thought about governance on Mars by now.

More recently, Ben Finney and I have been teaching in what is called a "Learning Community"--a marvelous new teaching opportunity which, if things go well, might

become the normal way to teach all incoming UH freshmen and sophomores.

In a Learning Community, two or more professors agree to coordinate their classes so that students enroll in both (or more) of the classes at the same time.

So in principle, and I would like it to be a reality sometime, not only would Ben Finney in Anthropology and myself in Political Science each teach our own space courses to the same students, but we would also be joined by, for example, someone teaching Astronomy, with a special focus on Mars, while someone from Architecture would focus her class on designing habitats on Mars. If we were really ambitious, we might have someone in English teach science fiction, with special attention to Mars. All to the same "Learning Community" of students.

While each professor teaches her own class separately, all of the students attend ALL of the classes in the Learning Community together, as a group.

This is not joint teaching--the professors are not teaching the same class together. They are teaching their own class their own way. It is the students who have the common experience.

However, Ben Finney is such a magnificent teacher--such an impressive, knowledgeable and spell-binding story teller--that I never miss his classes. I suspect I would be similarly drawn to the astronomy, architecture, science fiction or other courses as well.

And that then seriously cuts into my other teaching, research and consultations duties, so there would have to be limits here.

Anyway, Ben and I have been having a great time with our learning community. I focus on Mars and political design; he focuses on the analogy of Polynesian voyaging, and on his deep knowledge of especially Russian space history and philosophy. And the students love it.

And it turns out that no one else in the world has given much thought to what will happen after the first robots and explorers land on Mars (or the Moon or anywhere else) and ordinary settlers begin to arrive, as they will. That is why ISU invited Ben Finney to head their Space Humanities division. Ben then invited me to join him as co-director, and the two of us have now been teaching for five years in the ISU Summer Sessions and for the three years the Master of Space Studies has been in existence in France.

The multinational, multicultural, multidisciplinary students (and faculty) of ISU love thinking about the human dimensions of space as much as our UH students do. But being space professionals already--though only in some narrow field of specialization--they bring to our classes a very different perspective on space from that of our UH students.

Nonetheless, interestingly enough, our ISU students are as skeptical and as uncertain about the value of space exploration and settlement as the most skeptical and concerned person here among you might be.

That was the most surprising thing I learned at ISU. Young space professionals wonder as much as anyone else whether space is a waste, or a necessity. Our ISU students want to know they are truly doing the right thing with their lives. And so

they join Ben and myself very eagerly in trying to answer these fundamental questions, which, nonetheless, are so seldom asked, or answered:

Who might the earliest space settlers be? Why might they come? How might they want to govern themselves? What might be their relation to Earth, and to the people who sent them? What might be their relationships with each other--with other space settlements? How long will it be before they begin to change--to evolve into something not quite human, by Earthly standards, something, in this case, more Martian--psychologically, socially, politically, and eventually physiologically.

When might humanity itself begin to evolve and speciate in space?

In one of the most important volumes on space exploration and settlement from a human perspective, Ben Finney and Eric Jones "reiterate that the use of technology to expand beyond Earth would be entirely consonant with the whole trend of human evolution. From the time the most adventuresome of apes left the tropical forest to seek a living in the grasslands of the African savanna, our ancestors have been inventing technology to adapt to new environments and to expand over the globe. There is a large techno-cultural distance between grubbing succulent roots from the soil of the savanna with digging sticks on the one hand and growing algae to provide both food and oxygen for Moon colonies on the other. And it is a long way from sailing canoes to interstellar arks. But ever since our ancestors started using tools to survive and eventually flourish in new environments, the pattern of evolution by cultural as well as biological adaptation has been underway. Although the prospect of traveling and living in space might seem 'unnatural' to many, it would represent a logical extension to the technological path our ancestors have been following for some 5 million years." [In Ben Finney and Eric Jones, eds., Interstellar Migration and the Human Experience. University of California Press, 1985, p. 335.]

Humans, a profoundly migratory species, some time ago filled up every available ecological niche on Earth (except the ocean depths), and now are threatening to overpopulate themselves to extinction. Space (much more than under the seas) offers humanity the obvious next evolutionary step.

Now, I really don't want to make all that as unproblematic as it sounds.

While I am a big enthusiast for space, and thus for all the science and technology that goes with it, lots of folks, probably many in this room, feel quite the opposite; that at best, we humans are planet eaters; that it is bad enough we are devouring one planet without encouraging us to move on and eat some more.

So, I want to end this evening with some poems which help express the ambivalence we all should feel about ourselves as humans.

When I talk about this with my space students, here at UH as well as at ISU, I write the following on the board:

"What a piece of \*\*\*\* is a man"

What four-letter word would you write there? Well, if you know Shakespeare, and his Hamlet, you perhaps thought of this sublime statement of humanity:

"What a piece of work is a man! How noble in reason! How infinite in faculty!

In form and moving, how express and admirable! In action, how like an angel! In apprehension how like a god! The beauty of the world! The paragon of animals! And yet, to me, what is this quintessence of dust?"

But others, who have a less flattering view of humanity might write in some other four letter word.

Indeed, I am afraid it is this bit of a let down at the final three utterances by Shakespeare that got me to thinking:

"The beauty of the world!  
 "The paragon of animals!  
 "This quintessence of dust?"

So, I leave it to you to figure out what word YOU think should be written there. It is not an enormous step from concluding that humans are the quintessence of dust to realizing that they may just be a bloated piece of shit.

Alexander Pope expressed the ambivalence even more clearly:

"Know then thyself, presume not God to scan;  
 The proper study of mankind is man.  
 Placed on this isthmus of a middle state,  
 A being darkly wise and rudely great:  
 With too much knowledge for the skeptic side,  
 With too much weakness for the stoic's pride,  
 He hangs between; in doubt to act or rest;  
 In doubt to deem himself a god, or beast;  
 In doubt his mind or body to prefer;  
 Born but to die, and reasoning but to err;  
 Alike in ignorance, his reason such,  
 Whether he thinks too little or too much;  
 Chaos of thought and passion, all confused;  
 Still by himself abused, or disabused;  
 Created half to rise, and half to fall;  
 Great lord of all things, yet a prey to all;  
 Sole judge of truth, in endless error hurled,  
 The glory, jest, and riddle of the world"

Alexander Pope, "Essay on Man" (1733-34)

Let's turn more directly to the matter at hand: space. Consider the following poem by a famous American poet of the 19th Century, Walt Whitman, writing about a lecture on an evening perhaps not unlike this one:

When I heard the learn'd astronomer;  
 When the proofs, the figures, were ranged in columns before me;  
 When I was shown the charts and the diagrams, to add, divide, and measure  
 them;  
 When I, sitting, heard the astronomer, where he lectured with much applause  
 in the lecture-room,  
 How soon, unaccountable, I became tired and sick;



The Greeks also had many messages warning humanity against pride, technology and exploration--about humanity's dangerous trait of never begin able just to leave things alone. "Don't worry. Be happy," they advised: "Que sera, sera."

But no, there was Prometheus--whose very name means "foreknowledge" (the attempt to know the future)--who stole fire from the gods and, when caught, was tortured for eternity, and Pandora who insisted on opening her box of plagues and temptations, and Icarus--the boy who thought he could fly to the sun on waxen wings.

Icarus is the god of flight, including spaceflight, and of haughty pride that always goes before a fall.

Icarus has inspired countless paintings, sculptures, and poems. One by W. H. Auden is very well known. However, I will read here a poem by Ronald Bottrall, which is much less well known, but better suited for my purposes, I believe. Like the poem by Auden, that of Bottrall is inspired by a famous painting by the late medieval Dutch painter Breughel which depicts Icarus splashing into the sea while all around him life goes on in utter disregard of this incredible event. If you are familiar with the painting, think about it as you consider these words:

### **Icarus**

Ronald Bottrall

In his father's face flying  
 He soared until the cities of the Aegean  
 Opened like bloodvessels lying  
 Under a microscope. End on  
 He saw below the trunks of trees  
 While space-time flowered in his sunward eyes.  
 His feathered arms, extension  
 Of nimble thoughts, pride of invention,  
 Were lifting him high above man.  
 "And if I fly,"  
 He said, "to the source of mortal energy  
 I shall capture the receipt  
 To administer light and heat."  
 But sunlight to all eyes is not bearable  
 Or sunheat to all blood.  
 His motion turned to earth, unable  
 To sustain its presumptuous mood.  
 Falling he saw the cantilevered birds,  
 Their great humerus muscles bearing  
 Them in their spacious veering  
 Over shores and sherds  
 Over swords and words.  
 Like a detached leaf, feeble  
 In the wind, he fell,  
 A multitude of molecules  
 Organized in equal and parallel  
 Velocities (according to the rules  
 Of motion) to seek the ground.  
 And on the slope above the sea  
 The hard-handed peasants go their round  
 Turning the soil, blind to the body

Ambitious and viable, whose pride  
Will leave no trace in the quenching tide.

But not me. Boldly go, I say:

Come my friends,  
‘Tis not too late to seek a newer world.  
Push off, and sitting well in order smite  
The sounding furrows; for my purpose holds  
To sail beyond the sunset and the baths  
Of all the western stars, until I die  
It may be that the gulfs will wash us down:  
It may be that we shall touch the Happy Isles,  
And see the great Achilles, whom we knew.  
Though much is taken, much abides; and though  
We are not now that strength which in old days  
Moved earth and heaven; that which we are, we are;  
One equal temper of heroic hearts,  
Made weak by time and fate, but strong in will  
To strive, to seek, to find, and not to yield.

**Ulysses**(excerpt)

Alfred, Lord Tennyson

And finally:

And did those feet in ancient time  
Walk upon England's mountains green?  
And was the holy Lamb of God  
On England's pleasant pastures seen?

And did the Countenance Divine  
Shine forth upon our clouded hills?  
And was Jerusalem builded here  
Among these dark Satanic Mills?

Bring me my bow of burning gold!  
Bring me my arrows of desire!  
Bring me my spear! O clouds, unfold!  
Bring me my chariot of fire!

I will not cease from mental fight,  
Nor shall my sword sleep in my hand  
Till we have built Jerusalem  
In England's green and pleasant land.

**The New Jerusalem**

(excerpts)

William Blake

Or, as those of us in the Mars Learning Community at UH and at ISU would prefer to complete Blake's verse:

"We shall not cease from mental fight  
Till we have built our settlement  
On Martian red and tranquil land!"

So will you join me in adding another, needed, verse to our Alma Mater:

In Valles Marineris our Alma Mater waits  
For Martian songs and laughter to ring its opened gates.  
So come and join your children! The journey's now begun  
For wider truth and service, in world's beyond our Sun.