

ENCOUNTER

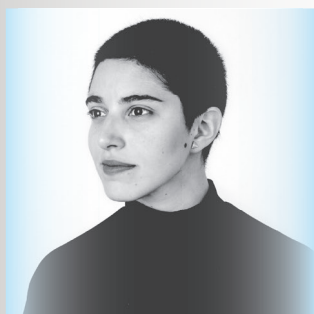


引言

自古以來，人類總是凝視著星空，探索宇宙奧秘和自然法則。自 1957 年蘇聯成功發射史潑尼克 1 號人造衛星以來，太空不再是遙不可及的幻想，而是人類文明的新邊疆。面對地球上的挑戰，太空探索及開發成爲一個現實選擇，但我們對跨星際親屬關係的理解卻仍待深化。透過影視、科技、藝術、文學和政策討論，我們不斷重塑和豐富對太空的想像，爲未來星際共生的生活樣態鋪路。此訪談集以共生的視角探索太空，展示三位太空產業不同背景參與者的獨特洞見，結合圖文資料，全面呈現人類對太空的多元觀點與視角。



Alvin Harvey



Nicole H'uiller



Danielle Wood

Q1

請向我們介紹一下您自己以及您所做的工作。

Alvin Harvey

我是麻省理工學院航空航天系的研究生。我目前的研究是關於微重力生物力學和微重力模擬。我也是麻省理工航空航天系所收的第一位納瓦霍（Navajo、Diné）後裔。

Nicole H'uiller

我是一位來自智利聖地亞哥的藝術家和研究員，目前居住及生活於波士頓，並在麻省理工學院媒體實驗室的「未來之歌」小組攻讀博士學位。我經常在裝置、表演、雕塑和作曲之間轉換身份，以探索人類和非人類的展演性，膜和聲響建築的儀式性，以及振動和聲音作為空間、身份與能動性的構築基底。我也參與了麻省理工學院媒體實驗室太空探索計劃，在那裡我以實驗形式探索藝術、表達和文化在外太空的含義。我也是實驗音樂人、鼓手、合成器愛好者，以及太空流行樂隊 Breaking Forms 組合成員。

Danielle Wood

我是 Danielle Wood，麻省理工媒體實驗室 Space Enabled 小組的主任。我的熱情在於利用太空技術作為促進正義的工具，使太空創新變得普及並對所有人有意義。通過與各領域合作，我們將太空技術應用於解決現實世界的難題，關注永續發展以符合聯合國目標。我們的工作致力於在科技和人性間搭建橋樑，確保太空技術能夠造福世界各地的社群。

Q2

構成太空探索的主要意識形態是什麼？它從冷戰軍備競賽的誕生到今天我們所說的「新太空時代」有沒有改變？

Alvin Harvey

長期以來，我都認為在太空行業工作遙不可及。我從小在貧窮的環境中長大，但是我對人類的經歷充滿了興趣。長大後，我的主要娛樂來源是我的想像力以及父母和祖父母講述的故事。我父親，一位傳統的納瓦霍人，是迄今為止我見過的最出色的講故事的人。當我們在納瓦霍預定區的塵土飛揚的道路上開車數小時時，他會分享許多他童年的故事和納瓦霍人的傳統故事。與父親一起在預定區（Reserve 簡稱 Rez）上生活時，我在祖母在亞利桑那州的住處住了很多晚。儘管身處一間狹窄的兩居室房屋中，無法獲得自來水，互聯網，在外頭拉屎，玩塑膠小兵，但這還是我最好的童年時光。儘管這種生活方式對我和我周圍的家人來說是正常的，但我對這種生活方式的苛刻並不盲目。在 Rez 上，沒有自來水，如果您想使用互聯網，開車要花一個多小時去圖書館，這是相對常見的。畢竟，這片資源荒漠使我渴望有朝一日能給祖母自來水或太陽能電池板，以使她的生活更輕鬆，更方便。由於我的家人遍布整個 Rez，所以我很理所當然地想讓每個人在 Rez 上的生活變得更加輕鬆和便捷。我父親參軍並前往伊拉克後，我原先想通過更容易獲得資源來設計更美好世界的願望改變了。

在伊拉克戰爭退伍軍人的父親和空軍退伍軍人的祖父的陪伴下，大家自然認為我會對設計下一代戰爭技術產生興趣。我希望設計能夠提高美軍士兵身體生存能力的技術。隨著年齡的增長，我以機械工程師的身份進入大學本科學習，我意識到生存能力的另一個方面，那是新的瞄準鏡或裝甲背心無法保證的領域：頭腦。我已經看到戰爭是如何直接對士兵造成無形傷害的。在我離開大學一年之前，我就與患有創傷後症候群（PTSD）的父親生活在一起，這使我堅定地認為，戰爭與玩塑膠小兵不同。



Photo credit: 3000 years among microbes

我因此對原本學機械工程的初衷有所幻滅。當時我有機會參加了由大學的太空資助聯合會（Space Grant Consortium）開展的一項研究計劃。美國國家航空航天局（NASA）曾經是神話般的野獸，它向太空資助計劃提供資金，以吸引年輕工程師參加大學領導的研究。誰不想為他們工作？我記得，美國航空航天局出現在大學的職業展覽會上，總會被各種各樣的新鮮面孔和渴望的工程師所淹沒。他們很屌，如果你和他們一起實習，那麼你也很屌。因此，有機會與他們合作，我便盲目接受了。回顧過去，我意識到自己想成為一個理想的一部分，這個理想比我自己或大學提供的理想更大。

我在那個項目上呆了四年，在那四年裡，我開始注意到我的工作中缺少一個很大的元素：人類。我已經研究並開發了微重力傳熱實驗的來龍去脈，但沒有學到任何東西或將其轉移給人類使用。人類始終是我最關心的。在 Rez 期間，我看到處在極其惡劣的環境中人體。此外，在駕駛飛機進入一個劇烈亂流量機而嘔吐時，我終於領悟，將人類的太空經驗與工程技術相融合的領域對我來說是合適的。我父親告訴我的故事不是關於機器或物體的故事，而是關於人及其經歷的故事。我真正關心的是那些會使用火箭前往太空或擁有足夠大的可以乘坐的衛星的人。我開始對在最極端環境（太空）的人類體驗感興趣。

Nicole H'uiller

我一直對外太空的廣闊詩意感興趣，從小就開始學習智利不同地方和土著群體的當地宇宙觀。從某種程度上說，智利是一個跟太空很有緣的國家，因為國家領土上有一些最重要的天文台，且星星如此繁多。因此，我像是在宇宙的敘事和聯繫中成長。然後我到麻省理工學院學習，遇到了圍繞太空探索發展的整個領域。這讓我感到很新奇，渴望了解他們的研究方法和方向。

然而，其中絕大多數似乎非常僵化，並對科技抱持過於樂觀的視角，以成長為主要任務。這對我來說不是很吸引人，我想知道人們在這個領域問什麼其他類型的問題。然後，我遇到了麻省理工學院媒體實驗室太空探索倡議，在那裡我看到了一個對技術進步及其影響擁有更多批評性觀點和質疑的地方。我遇到了一些非常有趣的小組成員，他們試圖改變敘事方式和討論方式，以塑造一個更加公正，連貫的太空未來，甚至思考著外太空文化的創造和影響以及如何改變這種討論方式。一個主要的例子是採用一種未來主義的方法，該方法包括混合敘事，並且支持藝術和推測性思維以激發想像力，或者在太空文化的構建中包含不同的聲音和宇宙觀，甚至改變語言和觀點，例如停止使用「殖民」框架，並理解這如何意味著一種榨取性和破壞性的文化。在參與這些對話時，我還遇到了不同的機會來圍繞這些問題進行項目開發和研究。



Photo credit: ESO/C. Malin (christophmalin.com)

太空探索背後主導的意識形態是什麼？從冷戰時代的軍備競賽到如今的「新太空時代」，這些觀念有沒有經歷變遷？

Alvin Harvey

太空探索多數情況下是被美國的例外主義所框限。在這「新太空時代」中，即使沒有明確的敵人存在，人類的自尊心依然是一個重要考慮因素。當今仍然存在的一個主導意識形態是將人類視為天生的探險者—充滿好奇心與勇氣，是文明的堡壘。在美國，這種觀念以「邊疆主義」(Frontierism)的形式呈現，並借用「新天命論」(New Manifest Destiny)這一語境來進行太空探索。

這種觀點源於一種對美國歷史的理想化詮釋，其中忽略了對自然和原住民的破壞。太空探索產業的擴張反過來又加強了這種「邊疆神話」，就像西部曾被認為是無人之地一樣，如今的太空也被視為無限資源的未開發領域。這種理想化的觀點往往讓人忽略了其可能的負面影響，從而持續驅動著美國的太空事業。

Nicole H'uiller

在我個人看來，太空探索的主要動力起源於一個追求誰做得更好的競爭心態。太空競賽以令人震驚的速度實現了讓人意想不到的成就，而其首要目標就是要做到最好、要做到第一，卻沒有花時間思考和討論道德和哲學問題。這就是一切的開端。與此同時，科幻小說有助於平衡這一點，並帶來關於未來主義、女權主義、勞動和混合社會的重要討論。雖然存在這些有趣的交流和對話，「新太空時代」卻似乎正在以私有化、資本主義和資源開採為基礎，推動企業和特定目標發展。這與資金提供者及其目的密切相關。我們必須改變這些觀點，並將其他被忽略或置於次要地位的重要議題納入考慮，這一點至關重要。

Q4

對於新太空時代，最有力的論據之一在於「賦權」，以前被排除在太空競賽之外的國家都有參與的機會。我們如何平衡民主化與自由市場新自由化之間的關係？

Alvin Harvey

我們首先要明白以前的太空競賽漏掉了哪些人。看看我們產業的領導人和專家，大多都是白人，這反映了西方的資本主義結構。進入太空在美國被看作是一種特權，不是大家都能享有的權利。要承認在美國生活的許多方面都有不平等，而我們的太空產業也有問題。我們太注重個人主義和客觀性，忽略了這些不平等，只是一味地把道德當作推動太空探索的理由。這是個大問題，而且我們可能會把這些問題帶到太空去。在決策的最高層需要更多代表性，要讓領導者明白誰一直被排除在外。歷史固然重要，但有時一個說得好的故事更能促使人們採取正確的行動。我們也許永遠改不了資本主義，但至少可以教人怎麼在這個系統裡讓事情更公平。

Nicole H'uiller

這是一個很好的問題，但也是一個棘手問題。因為即使現在「任何人」都可以參與討論，而不再僅限於政府機構——這是一件好事，這個產業仍存在著非常垂直的等級制度，使自由使用權僅是一種幻想，因為資本支配著誰在說什麼，誰的信息更有影響力。這就是為什麼我珍視人們為滲入和翻轉敘事所做的努力，他們顛覆了榨取性觀點，並圍繞倫理、哲學和文化問題進行更具包容性的對話。

Danielle Wood

我們並非身處一個前所未見的時代，只是規則有所不同。國際法仍然管轄著私人太空公司——聯合國委員會涵蓋了 90 個國家，已經制定了五項關鍵的太空法律條約。這些條約明確了管理太空探索、利用和活動的原則。現有的法律框架有助於確保太空被和平地探索和使用，並促進國際合作和遵循負責任的太空行爲。挑戰在於確保這些法律和原則得到有效執行，允許在商業利益和道德考量之間取得平衡。這個太空探索的新時代要求我們重新思考現有的規範，並可能調整國際法規以適應科技進展和全球利益的演變。

Q5

如果自由市場的邊疆主義正在推動這個新太空時代，我們應該旅行嗎？我們不應該嗎？

Alvin Harvey

更值得關切的是，實現這種旅行所需的基礎設施。正如現有的自由市場邊疆主義，一般人短期內能夠進行太空旅行的可能性微乎其微。未來的基礎設施卻可能重複過去邊疆主義所犯的同樣錯誤和不公。

Nicole H'uiller

這個議題非常微妙，即便我們不進行太空旅行，也有可能通過其他方式發揮影響力。有許多途徑讓我們能積極參與對話並影響敘事。然而，若我們選擇旅行，將有機會引起更多關注，甚至讓我們的聲音被聽見。重要的是要權衡利弊，並根據旅行的目的以及如何有效傳達這些想法來有意識地做出決策。

當前太空旅行的框架缺失了哪些要素？ 我們應如何重新思考？ 應該放大哪些聲音、詢問 或聆聽哪些人？

Q6

Alvin Harvey

在當前太空工業中，邊疆主義盛行和整體殖民主義的態度都很突出。在反殖民主義和對自然宇宙的尊重方面，美洲印第安人是最重要的專家。除他們之外，幾乎沒有人親身經歷過邊疆主義推動的行業所帶來的非人性化和有害影響。我們美國原住民在祖先的醫學和知識指導下走上了自己的道路，深刻理解到所有人和萬物都息息相關。我們不僅與人類相連，還與所有生物、無生命的事物、地球、天空乃至更遠的地方相連。地球是每個人的家，每個人都有責任保護它。每個人在康復過程中都有作用，無論他們是施加了痛苦還是承受了痛苦。我們的痛苦、康復和繁榮都是共享的。我們的集體家園包括更廣闊的自然世界，我們的集體福祉同樣需要關注被遺忘和壓迫的聲音，尤其是美洲原住民的聲音。

Nicole H'uiller

我認為，傾聽那些一直關心地球而非破壞它的人非常重要。我們需要了解替代模型，以便在與環境、資源和其週期建立相互關照的關係時更尊重他人。原住民社區、集體思維、祖先哲學以及不依賴化石燃料就能訪問星際的群體的宇宙觀，都值得我們學習。

Danielle Wood

我的一名博士生正在撰寫有關太空治理的論文，假設人們將被派往月球居住，這在當下幾乎無法阻止。對於第一代，我們不太擔心，因為他們主要是科學家，重視科學目標而非殖民。未來的一代將高度依賴生命支援技術，所以掌握這些技術的人將制定規則。我有朋友在 SpaceX 工作，他們描述了高壓、惡劣的工作條件和長工作時間。如果將這些轉移到太空，問題就在於你的雇主控制你的生命支持系統，所以抗議或不同意是不安全的。太空中可能出現專制領導，船長將成為最高權威。但如果你在月球，你是軍人還是僱員呢？我們應該首先詢問那些對太空感興趣且有原住民背景的人，他們了解生活在人類活動和國家活動緊密相連的環境中意味著什麼。我們如何可持續地組織領導結構？或者我們可以向居住在南極洲的小社區學習，了解他們是如何創造健康生活環境的？

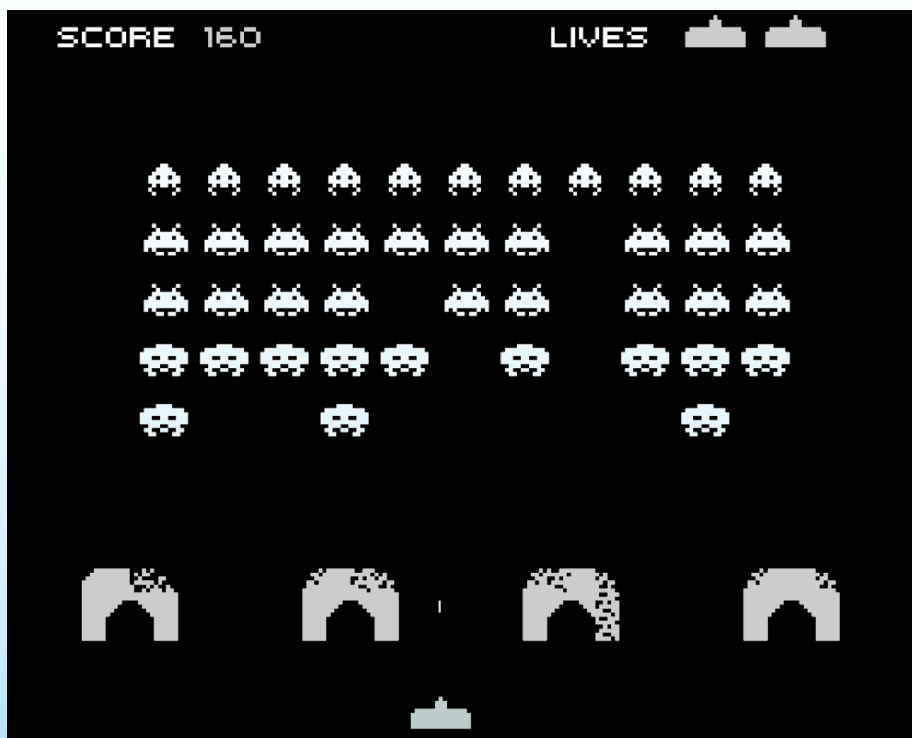


Photo credit: Space Invader

你如何想像圍繞「探索」太空的語言能實現去殖民化？

在這個語境中，去殖民化具體意味著什麼？

該如何達成這一目標？

Alvin Harvey

去殖民化不僅是語言的轉變，更是一個實質性的行動，意味著土地的歸還給原住民。這一理念也適用於太空，以土地或外太空區域所有權的形式出現。目前的太空探索實際上呈現出定居者殖民主義的特徵，這是一種深刻的結構性問題，而非單一事件。這種探索的多數動機植根於後殖民或殖民性的理論，而這些理論往往忽略了定居者殖民主義的影響。我們必須重新思考與宇宙、甚至於「土地」的關係，這一關係不應僅限於資本和財產。我們應當肩負起對太空的集體責任，這一責任建立在相互尊重、互惠和關懷的基礎之上，而非資源開發或土地所有權的累積。去殖民化太空探索語言，意味著我們需要重新檢視和定義那些在地球上長久以來用以合理化不公正行為的思想基礎。這樣的轉變或許會令人不安，但它是從「我們與他們」到「全體為一」思維轉變的必要步驟。

Nicole H'uiller

重塑語言不僅是字面上的文字改變，更是對背後意涵和目標的深刻反思。以火星「殖民化」為例，這樣的措辭不但揭露了我們對太空探索的殖民心態，更可能激發相應的行動模式。因此，我們不僅需要更換用語，也需重新審視整個任務的核心價值和目的。我們應該建立一個新的觀點，其中心不再是資源提煉和權力積累，而是建立在互相尊重和可永續基礎上。

在我的研究領域中，我努力但進展緩慢地將解殖和反種族主義觀點納入討論。我與來自全球的太空產業專家有密切聯繫，並特意詢問他們是否意識到與殖民主義和剝削相關的問題。要深入了解這些問題，必須回顧歷史。例如，古代的航海技術和現代太空技術有著驚人的相似性，都涉及到資源和人力的大規模剝削。

在過往世紀中，船舶的發明和航海能力提升為全球奴隸貿易和資源掠奪鋪平道路。這與今天對月球上氦-3和其他礦物的開採有著明顯的平行性。同時，今日的電腦和智能手機也與在危險環境中開採鋰和鈷有關。

解殖太空不只是對資本主義的拓展說「不」，更是一場反思我們如何看待太空的議論。太空不應 ZD：在我的研究領域中，我努力但進展緩慢地將解殖和反種族主義觀點納入討論。我與來自全球的太空產業專家有密切聯繫，並特意詢問他們是否意識到與殖民主義和剝削相關的問題。要深入了解這些問題，必須回顧歷史。例如，古代的航海技術和現代太空技術有著驚人的相似性，都涉及到資源和人力的大規模剝削。

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解殖太空不只是對資本主義的拓展說「不」，更是一場反思我們如何看待太空的議論。太空不應被視為資本主義的新前沿，而更像是一個應當被保護和尊重的自然公園。我們將慶祝它的美麗（例如大峽谷），而不是創造資本。過去五百年來，我們一直活在資本主義框架內，現在是時候考慮未來世代、原住民社群福祉及他們的神聖信仰了。被視為資本主義的新前沿，而更像是一個應當被保護和尊重的自然公園。我們將慶祝它的美麗（例如大峽谷），而不是創造資本。過去五百年來，我們一直活在資本主義框架內，現在是時候考慮未來世代、原住民社群福祉及他們的神聖信仰了。

Q8

如果您可以更改太空探索中常用的一個術語（如邊疆、發現、殖民、定居等），那會是什麼？
為什麼？

Alvin Harvey

語言不是中立的，它常帶有歷史偏見的重量。例如，「殖民」這個詞回溯到地球漫長而痛苦的定居者殖民歷史。當我們設想與天體的關係時，也許我們應選擇能喚起尊重和責任感的詞語。例如，「家」這個詞可能很適合這個目的，讓我們在探索星辰時也有道德的基礎。

Nicole H'uiller

在太空探索的語境中有很多有問題的詞，但「殖民」是一個具有深刻結構性含意的詞。這不僅僅是一個詞，它是一種特定世界觀的體現。

Danielle Wood

我們不應該輕易抹去「殖民」這個詞，反而應該深入了解它所代表的重量與歷史。想像未來的月球被吹捧為度假或採礦的新樂土，這時候，稱之為「殖民」不只是字面上的意義，而是一個令人不安的真相。我們應該刻意使用這個詞，以凸顯需要正視的問題，譬如它在歷史上的角色和對地球的持續影響。遺憾的是，大多數人對這些議題避而不談。他們或許會毫不猶豫地預訂一趟月球之旅，卻忽視了這其中的種種含義，更甚至對地球上仍在發生的殖民活動視若無睹。因此，我們應該繼續使用「殖民」這個詞，但也必須將其視為一個不斷提醒我們地球目前問題的鏡子。我們是否能在探索太空的過程中，建立一個更符合人類共同利益的社會？



Photo credit: 3000 years among microbes

Q9

您對「第一類接觸 (first contact)」一詞有何看法？

Alvin Harvey

「第一類接觸」這個詞彙不僅帶有軍事色彩，而且根植於殖民時代的敘事。儘管最早出現在科幻小說中，它卻塑造了我們對於太空探索的主流思想，強調了一種地球中心的殖民視角。這個詞不僅強化了科幻小說中的主題，也進一步固化了我們內在的殖民主義傾向。

Nicole H'uiller

我認為「首次接觸」這個詞過於形式化和量化。相比之下，「相遇」這個詞更能凸顯其開放和多元的特質。

Danielle Wood

相較於電影中的精彩場面，現實的「首次接觸」可能會相對平淡。如果我們有幸能送達機器人至火星或其他星體，發現的很可能只是古老的微生物化石。這對科學界而言極具意義，但普羅大眾是否能感同身受仍是未知。我擔憂在這樣的語境下，人們可能會誤解殖民行為的嚴重性。

Q10 對於外星生命，我們有哪些基本假設？

「接觸」背後的恐懼或想像是什麼？

Alvin Harvey

對外星生命的潛在發現往往帶有多重恐懼。這些恐懼可用於挑戰或強化我們對人類特殊性的觀念。科幻文學通常強調這種發現，從中我們可以看出，無論是將人類視為殖民者還是被外星生命殖民，這些敘述都是通過地球殖民的角度來建構的，很少有質疑或超越我們的殖民衝動。

Nicole H'uiller

我們通常害怕未知和差異，這是由我們的文化教育所培養的。然而，這些外星生命的接觸可能在多個層面上為我們帶來啟發和豐富的經驗。無疑，這樣的接觸將會改變我們在宇宙中的位置、我們對生命的認知，以及其他多個方面。我認為，這種變革是積極的和必要的。重新定義人類在宇宙中的存在肯定能讓我們重新思考地球上的社會問題。

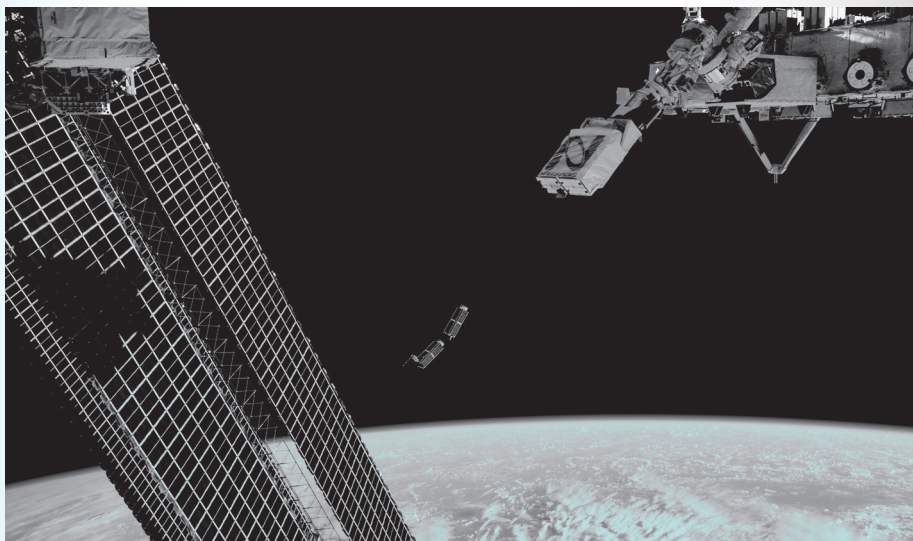


Photo credit: NASA

Q11

自然權利是否應該適用於外太空？如果是，該由誰來決定？

Alvin Harvey

說到太空的「所有權」，這個概念實際上應該屬於全人類，就像是一種太空共同體。這種所有權和責任不應該僅由一個人或一個國家來承擔，而應該由全世界對太空充滿敬意和欣賞的人們共同分享。但很不幸地，我們對於地球上自然權利的理解和實踐都有嚴重缺陷，導致了對自然環境的破壞和不尊重。我們經常忘記，這個世界上的動物和自然景觀不是為了人類而存在的，就像黑人不是為了白人而存在，婦女也不是為了男人而存在。每一個生命體都有存在和繁衍的基本權利，這一點對於我們接下來可能會探索和開發的外太空來說尤為重要。

Nicole H'uiller

當前的情況是，即使在地球上，自然的權利也常常被忽視或者遭受侵犯。因此，在考慮將這些權利擴展到外太空之前，我們首先需要在地球上做好。然而，我認為在討論太空探索的同時，考慮天體和外太空環境的權利是非常必要的。

Danielle Wood

我不認為我們需要等到找到外星生命後，才開始考慮尊重其他星球的權利。即使一個星球上沒有生命，這並不意味著我們可以隨意地開採其資源或對其進行殖民。月球是否有不被轉變成礦場或其他商業活動的基地的權利？這是我們需要認真考慮的。

您認為藝術和講述故事在塑造及校正對星際共生樣態的想像方面扮演什麼角色？

Q12

Alvin Harvey

作為一名美國原住民，敘事和藝術是我們文化和歷史的核心。從我們的歌曲、祈禱到笑話和敘事，這些元素不僅提供娛樂，而且是教育和價值觀的傳承途徑。如果我們希望在其他星球上實現親屬共生，我們需要在殖民、邊界主義、第一 before we discover extraterrestrial life 類接觸、資源利用等方面重新考慮和教育我們的價值觀。一個觸動人心的故事可以喚起道德行動，甚至影響制度變革。

Nicole H'uiller

我認為藝術和敘事在重塑和增強星際親屬共生的想像力方面發揮著關鍵作用。它們不僅可以轉變觀點，也可以實質影響決策過程。藝術和敘事作為一座橋樑，能將這些討論引向更廣泛的觀眾，並包括目前被排除在外的群體。太空是全人類共有的，每個人都應該有發言權，而不僅僅是特權階層。

Danielle Wood

與太空產業的專家建立聯繫至關重要，這樣我們的敘事才有可能影響他們。目前，業內人士主要關注宇航員的微生物群變化，卻很少考慮微生物的倫理和權利。提供這種獨特觀點是非常有力的。挑戰在於，如何構建一個足夠說服力的敘事來影響決策者。

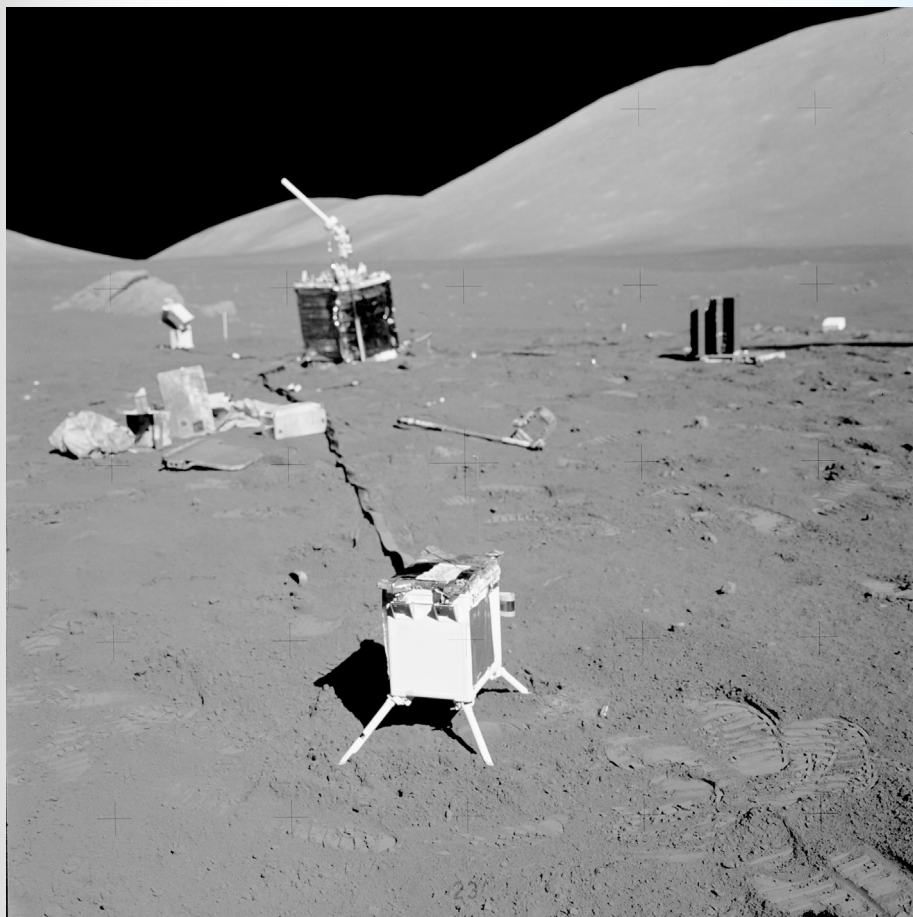


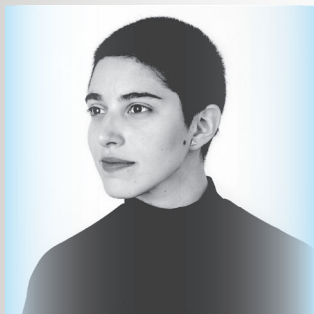
Photo credit: NASA

Intro

Since ancient times, humanity has gazed at the stars, probing the profound mysteries of the universe and the inherent laws of nature. Since the launch of "Sputnik 1" by the Soviet Union in 1957, space has transitioned from a distant fantasy to a new frontier for human civilization. Faced with Earth's challenges, space exploration and development emerge as a tangible option, yet our grasp of interplanetary kindred living remains to be refined. Through cinema, technology, art, literature, and policy discussions, we constantly reshape and enrich our perception of space, laying the groundwork for future modes of interstellar coexistence. This collection of interviews explores space from the perspective of coexistence, showcasing unique insights from three diverse participants in the space industry, and, combined with visual and textual materials, offers a comprehensive portrayal of humanity's multifaceted views on space.



Alvin Harvey



Nicole H'uiller



Danielle Wood

Q1

Please tell us a little about yourself and the work you do.

Alvin Harvey

I am a graduate student at MIT in the Aeronautics and Astronautics department. My current research is on microgravity biomechanics and microgravity simulation. I am also the first person of Navajo (Diné) descent to be accepted into MIT's Aeronautics and Astronautics department.

Nicole H'uiller

I am an artist and researcher from Santiago, Chile, currently based in Boston while doing a Ph.D. at MIT Media Lab in the Opera of the Future group. My work shifts from installations, performances, sculptures, compositions, and multiple transductions to explore human and non-human performativity, rituals of membranal and resonant architectures, and vibration and sound as construction materials for spaces, identity, and agency. I am also part of the MIT Media Lab Space Exploration Initiative, where I explore experimental forms and implications of art, expression, and culture in outer space. I am also an experimental musician, drummer, synth lover, and one-half of the space pop duo Breaking Forms.

Danielle Wood

I'm Danielle Wood, the Space Enabled research group director at the MIT Media Lab. My passion lies in using space technology as a tool for justice, making space innovation accessible and meaningful to all. Through collaboration with various sectors, we apply space technology to solve real-world problems, focusing on sustainability and aligning with the United Nations Sustainable Development Goals. Our work bridges the gap between technology and humanity, ensuring that space-enabled solutions can benefit communities worldwide.

Q2

What drew you to doing work about space or working in the space industry?

Alvin Harvey

For a long time, I believed working in the space industry was far out of reach. I grew up poor and behind in school, but I grew up with a hearty interest in the human experience. Growing up, my primary source of entertainment was my imagination and the stories my parents and grandparents told. My father, who grew up as a traditional Navajo, is the best storyteller I have ever met. He would share many stories of his childhood and classic Navajo stories while we drove on the dusty roads for many hours on the Navajo Reservation.

While living with my father on the "Rez," I spent many nights at my grandmother's place in Arizona. Despite being in a cramped two-bedroom house with no access to running water, internet, shitting in an outhouse, and playing in the dirt with little plastic green army men, they were some of my best childhood days. I was not blind to the harshness of this lifestyle despite its normalization to me and the family surrounding me. It was relatively common on the Rez to not have running water and to drive over an hour to go to a library if you wanted to use the internet. After all, this resource desert gave me an early desire to share my grandmother's running water or solar panels, anything to make her life easier and more convenient. Because my family was spread throughout the Rez, it was easy for me to want to make everyone's life on the Rez easier and more convenient. This desire to design a better world through more accessible access to resources changed when my father joined the Army and left for Iraq.

With an Iraq War veteran father and an Air Force veteran grandfather, it seemed natural that I would gain interest in engineering the next generation of war-fighting technology. I desired to design technology that would improve the physical survivability of American soldiers. As I got older and entered my undergraduate education as a mechanical engineer, I realized there was an aspect of survivability that cannot be assured by a new gun sight or armored vest: the mind. I had seen how war inflicted invisible injuries upon soldiers firsthand. Living with my father, who suffered from Post-Traumatic Stress Disorder (PTSD) a year before I left college, solidified that war was not the same as playing with little green army men.



Photo credit: 3000 years among microbes

Disillusioned with my original purpose for mechanical engineering, I had the chance to intern in a research program run by my university's Space Grant Consortium. NASA, the mythical beast it was, had given the Space Grant funding towards getting young engineers to participate in University-led research. Who wouldn't want to work for them? Even if by proxy. I recall that NASA would appear at university career fairs and be inundated with fresh-faced and eager engineers of all varieties. They were hot shit, and if you got an internship with them, you were hot shit too. That blue meatball accentuated by red vectors embroidered on their shirts and their ability to toss resumes into a massive pile on their desk gave them an air of unattainability and superiority. So, allowed to work with them, I unquestioningly accepted it. Looking back, I realized I wanted to be part of an ideal more influential than myself or what was offered at my college.

I stayed on that project for four years, and through those four years, I noticed that a massive aspect of space was absent from my work: humans. I had worked and developed the ins and outs of a microgravity heat transfer experiment, but something needed to be learned or transferred to human use. The human body was always in my interest. I have experienced the human body in enormously harsh environments during my time on the Rez. Moreover, in an experience of throwing up from air sickness while piloting an aircraft into an intensely turbulent landing on one sunny day, I finally knew that the field that blended the human experience in space with engineering was for me. The stories told to me were not stories of machines or objects but of people and their experiences. I could have given less of shit about a rocket or satellite. I truly cared about the people who would use the rocket to travel to space or have a significant satellite for a human to ride in. I became intensely interested in the human experience in space's most extreme environment.

Nicole H'uiller

I was always interested in the poetics of outer space and its vastness. I grew up learning about the local cosmologies of different places and indigenous groups in Chile. Chile is a very spatial country since there are some of the most important observatories in the territory, and the stars are so present. Consequently, we grew up with a cosmic narrative and connection. Then, I got to study at MIT and encountered this whole group of people and field developing around Space Exploration. It intrigued me, and I was curious to know their approach and research directions.

However, most of it seemed rigid and with a techno-optimistic perspective, with the mission of growth as the main thing, which could have been more appealing. I wondered what other types of questions people were asking about this field. Then, I encountered the MIT Media Lab Space Exploration Initiative, where I saw a place where there could be more critical perspectives and questioning on technological advancements and their implications. I met some fascinating people working on this group trying to shift the narratives and discourse to shape a more just and coherent space future, even thinking about the creation and influence of culture around outer space and how that can change the address and narratives that drive our present today. One prominent example would be to have a futuristic approach that embraces hybrid records, supports art and speculative thinking to stimulate imagination, includes different voices and cosmologies in the construction of space culture, or even changes the language and perspectives, such as stopping talking about "colonizing" and understand how this implies an extractive and damaging culture. I also encountered opportunities to develop projects and research around these questions during these conversations.



Photo credit: ESO/C. Malin (christophmalin.com)

What are the prevailing ideologies that have framed space exploration? Have these ideologies evolved from the Cold War arms race era to the present “new space age”?

Alvin Harvey

Space exploration has largely been framed through the lens of American exceptionalism. In this “new space age,” even without a defined adversary, the stakes of human pride remain high. A predominant ideology persists in the notion of humans as natural explorers—beacons of curiosity and bravery and pillars of civilization. In the United States, this notion manifests as “Frontierism,” drawing from the context of a “New Manifest Destiny” for space exploration.

This perspective is rooted in a romanticized interpretation of American history, overlooking the negative impacts on nature and indigenous peoples. The expansion of the space industry, in turn, reinforces this “Frontier Myth,” likening space to an uninhabited territory with limitless resources. This idealized viewpoint often obscures its potential drawbacks, thereby perpetuating the momentum of American space endeavors.

Nicole H'uiller

In my opinion, the dominant ideologies started with a big focus on who is better. The space race created an injection of over-achievement at a breakneck pace, and the priorities were set on being the first, being the best, and not on reflecting and discussing ethical and philosophical questions. That was the genesis of all this. In parallel, science fiction was a field that helped balance this and brought essential discussions around futurism, feminism, labor, and hybrid societies. Despite this and some exciting crossings and dialogues, the “new space age” fosters enterprises and objectives from a private, capitalist, and extractive endeavor. It has much to do with who is financing these initiatives and their agenda. It is essential to change these perspectives and include other important topics that are being left on a secondary plane.

A strong argument for the new space age is empowerment; parties previously excluded from the space race have an opportunity for engagement. How do we balance the relationship between democratization and free market neo-liberalization?

Q4

Alvin Harvey

We first need to understand who was left out of the previous space race. Look at our industry's leaders and experts; most are white, reflecting Western capitalism. Entering space in the United States is seen as a privilege, not a right everyone can enjoy. There are inequalities in many aspects of life in America, and we must admit that. Our space industry has problems, too. We're too caught up in individualism and objectivity, overlooking these inequalities and simply using morality as a reason to push space exploration. This is a big issue; we might carry these problems into space. At the highest decision-making levels, we need more representation to make leaders understand who's continually being left out. History is essential, but sometimes, a well-told story can encourage people to take action. We may never change capitalism, but we can at least teach people how to make things fairer within this system.

Nicole H'uiller

This is a great question but is also a tricky one. Because even if it is a positive thing, now "everybody" can have access and participate in the discussions, not only governmental agencies. There is still a vertical hierarchy; free access is an illusion since capital will dictate who has a saying and whose message is more influential. I value people's efforts to infiltrate and shift the narratives, destabilizing ideas that support only extractive views and creating more inclusive conversations around ethical, philosophical, and cultural problems.

Danielle Wood

We're not in a never-before-seen era, just different rules. International laws still govern private space firms—the UN committee, involving 90 countries, has crafted five key treaties that make space laws. These treaties lay out principles that govern space exploration, utilization, and the conduct of space activities. The existing legal framework helps ensure that space is explored and used for peace purposes and promotes international cooperation and adherence to responsible space behavior. The challenge remains in ensuring these laws and principles are enforced effectively, balancing commercial interests and ethical considerations. This new era of space exploration requires rethinking existing norms and potential adjustments to international regulations to adapt to technological advancements and evolving global interests.

Q5

If free-market frontierism is driving this new space age, should we travel? Should we not?

Alvin Harvey

What's more concerning is the infrastructure that will make such travel possible. Just like the current state of free-market frontierism, the likelihood of the average person being able to travel to space shortly is minimal. However, the infrastructure that might enable this in the future could repeat the same mistakes and injustices of past frontierism.

Nicole H'uiller

This is a delicate topic, and it's possible to impact even without traveling to space. There are many ways for us to participate in the conversation and influence the narrative actively. However, if we choose to travel, there is a greater opportunity to garner attention and have our voices heard. The important thing is to balance the pros and cons and make a conscious decision based on the purpose of the travel and how these ideas can be effectively communicated.

What elements need to be added to the current framework of space travel?

How can it be rethought?

Whose voices should we amplify, and who should we consult or listen to?

Alvin Harvey

In the present space industry, the prevalence of frontierism and overarching colonial attitudes is striking. The Native Americans are crucial experts in anti-colonialism and respect for the natural universe. Beyond them, hardly anyone has firsthand experience of the dehumanization and harm brought by industries driven by frontierism. Guided by our ancestors' medicine and wisdom, we Native Americans have embraced our path, deeply understanding that all beings and things are interconnected. This connection extends to humans and all living creatures, inanimate objects, the Earth, the sky, and even further. Earth is everyone's home, and it's everyone's responsibility to protect it. Everyone plays a role in healing, whether they have inflicted or endured pain. Our pain, healing, and prosperity are shared. Our collective home includes the broader natural world, and our collective well-being necessitates attention to forgotten and oppressed voices, particularly those of Native Americans.

Nicole H'uiller

It is crucial to listen to people who have been caring for our Earth instead of the ones who have been damaging it. It is important to understand alternative models that can help us be more respectful when creating a relationship of care with the environment, its resources, and its cycles. There is much to learn from Indigenous communities, collective thinking, ancestral philosophies, and the cosmologies of groups visiting the stars without fossil fuel.

Danielle Wood

One of my Ph.D. students is working on a thesis about space governance, assuming that people will be sent to live on the moon, something almost unstoppable at this point. For the first generation, we are less concerned as they will primarily be scientists focused on scientific goals rather than colonization. Future generations will highly depend on life-support technologies, so those controlling these technologies will set the rules. My friends at SpaceX describe high pressure, harsh conditions, and long working hours. If these are transferred to space, the issue is that your employer controls your life-support system, so protesting or disagreeing becomes unsafe. Despotism in leadership may emerge in the cosmos, with the captain becoming the ultimate authority. But are you military or an employee if you are on the moon? We should ask those interested in space with indigenous backgrounds, as they understand what it means to live in an environment closely connected to human and state activities. How do we sustainably organize leadership structures? Or we can learn from small communities living in Antarctica, understanding how they create healthy living environments.

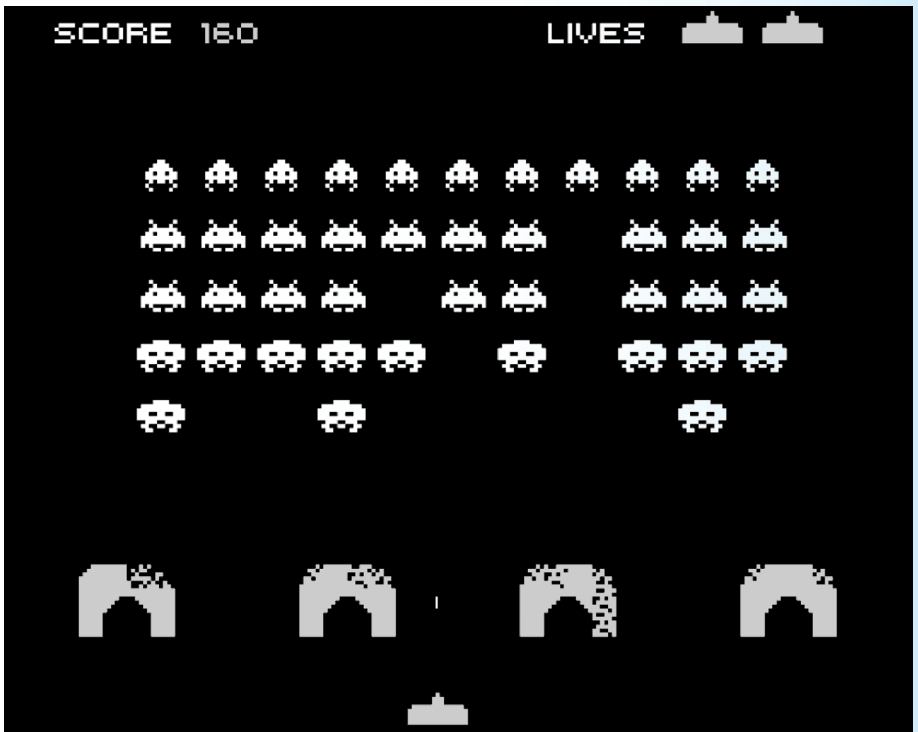


Photo credit: Space Invader

Q7

How do you envision the decolonization of language surrounding space “exploration”? What does decolonization mean in this context, and how can it be achieved?

Alvin Harvey

Decolonization is more than a linguistic shift; it is a tangible action signifying the return of land to Indigenous people. This principle extends to space in terms of land or outer-space territorial ownership. Current space exploration manifests features of settler colonialism, which is a profoundly structural issue rather than an isolated event. Most motivations for such investigation are rooted in postcolonial or colonial theories that often overlook the impact of settler colonialism. We must rethink our relationship with the cosmos, even its “land,” beyond just capital and property. We should assume a collective responsibility toward space founded on mutual respect, reciprocity, and care, not merely resource exploitation or land ownership. Decolonizing the language around space exploration means we must reexamine and redefine the underlying ideologies that have long justified injustices on Earth. This transition may be unsettling for many, but it is a necessary step toward shifting from an “us versus them” to an “all together” mindset.

Nicole H'uiller

Redefining language goes beyond merely changing our words; it involves profoundly rethinking their underlying meanings and objectives. Take the “colonization” of Mars as an example; this phrasing not only reveals a colonial mindset toward space exploration but may also encourage corresponding patterns of behavior. Therefore, it's crucial to change the terminology and reexamine the core values and purposes of the mission itself. We should establish a new perspective centered not on extraction and power but on mutual respect and sustainability principles.

In my line of research, I make a conscious but slow-moving effort to include perspectives on decolonization and anti-racism. I maintain close relationships with experts in the global space industry and specifically ask them whether they know about issues related to colonialism and exploitation. To deeply understand these complexities, looking back at history is essential. For instance, ancient maritime and modern space technologies share unsettling similarities, involving large-scale exploitation of resources and labor.

Over the past centuries, the invention of ships and advancements in navigation laid the groundwork for the global slave trade and resource plundering. This draws a noticeable parallel with today's ambitions to mine helium-3 and other minerals on the moon. Additionally, the proliferation of today's computers and smartphones is intrinsically linked to the hazardous extraction of lithium and cobalt.

Decolonizing space is not just about saying 'no' to the expansion of capitalism; it's a discourse that re-evaluates how we perceive space. Rather than viewing it as a new frontier for capitalist endeavors, it should be considered more like a natural park that demands respect and preservation. Where you celebrate its beauty (like the Grand Canyon) and not create capital. After living under the framework of capitalism for the last 500 years, it's high time we contemplate the well-being of future generations and indigenous communities, along with their sacred beliefs.



Q8

If you could change one term often used in space exploration (e.g., *Frontier*, *Discovery*, *Colonization*, *Settlements*, etc.), what would it be and why?

Alvin Harvey

Language is not neutral; it often carries the weight of historical biases. For instance, 'colonize' refers to Earth's long and painful settler colonialism history. As we envision our relationship with celestial bodies, we may opt for terms that evoke respect and responsibility. A word like 'HOME' could serve this purpose well, grounding us in an ethical context as we reach for the stars.

Nicole H'uiller

While many terms used in the context of space exploration are problematic, 'colonization' stands out as a term with deeply structural implications. It's not just a word; it's an embodiment of a particular worldview.

Danielle Wood

We shouldn't just discard the term 'colonization.' Instead, let's understand its weight and history. Imagine a future where lunar vacations and moon mining are marketed as the next big thing. In this scenario, calling it 'colonization' is not just semantics; it's a hard truth. Let's use the term intentionally to bring attention to the problems that need addressing, like its historical context and ongoing impacts on Earth. Unfortunately, not many are willing to face these issues. People may book a trip to the Moon without even considering the implications, all while turning a blind eye to current acts of colonization here on Earth. So, let's keep using the term, but always as a reference point to Earth's ongoing struggles. Can we aim for better practices in space that reflect the collective good of humanity?



Photo credit: NASA

Q9

What are your thoughts on the term "first contact"?

Alvin Harvey

"First contact" is an inherently militaristic and steeped term in colonial narratives. Although initially coined in science fiction, it has influenced mainstream conceptions of space exploration, emphasizing an Earth-centric, colonial perspective. This term not only reinforces themes in science fiction but also perpetuates deeply ingrained colonialist attitudes.

Nicole H'uiller

I find the term "first contact" somewhat rigid and quantitative. In contrast, I prefer "encounter," which feels more open and diverse in its implications.

Danielle Wood

Unlike the dramatic scenes depicted in movies, a real-life "first contact" would likely be much more mundane. At this point, we can most hope for sending a robot to Mars or another celestial body to discover a fossilized microbe from eons ago. While this would be monumental for the scientific community, whether the general public would be as emotionally affected remains to be seen. I worry that such scenarios may mislead people about the seriousness of colonization. We need to rethink, for instance, whether the moon has the right to exist naturally rather than being exploited for resources.

Q10 What are the underlying assumptions concerning alien life, and what fears or imaginaries lie behind the notion of “contact”?

Alvin Harvey

There's often a multitude of fears surrounding the potential discovery of extraterrestrial life. These fears may challenge or reinforce our perceptions of human exceptionalism. Science fiction commonly amplifies these discoveries, revealing that whether we consider humans as colonizers or aliens as such, these narratives are constructed through the lens of terrestrial colonization, seldom questioning or moving beyond our colonizing impulses.

Nicole H'uiller

We often fear what we don't understand or what's different from us, a sentiment often cultivated by our cultural upbringing. However, contact with alien life could be intellectually and emotionally enriching on multiple levels. Such an encounter would undeniably shift our understanding of our place in the cosmos, our conception of life, and much more. Such a transformation is both positive and necessary. Redefining human existence in the universe will likely provoke us to re-examine our social problems on Earth.

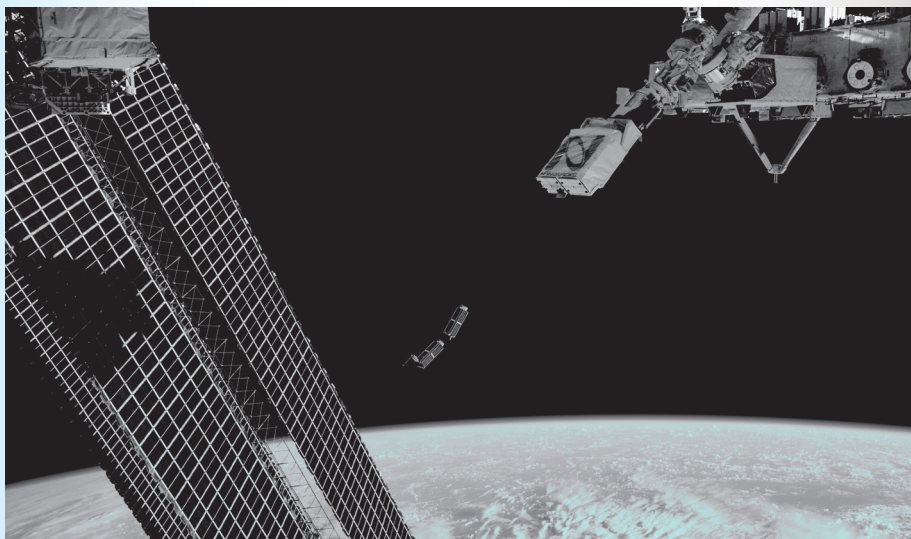


Photo credit: NASA

Q11

Should the rights of nature extend to outer space? And if so, who gets to decide?

Alvin Harvey

When we talk about the "ownership" of space, this concept should belong to all humanity, like a kind of cosmic commons. Such ownership and the responsibility attached to it should not be borne by just one person or one country but should be a shared commitment among all the Earth's people who have a sense of wonder and respect for space. Unfortunately, our understanding and practice of natural rights on Earth have significant flaws, leading to the degradation and disrespect of our natural environment. We often forget that animals and natural landscapes are not here for human utility, any more than black people are for white people or women are for men. Every life form has the fundamental right to exist and flourish, which becomes increasingly pertinent as we consider the realms of outer space that we may explore and potentially exploit.

Nicole H'uiller

The current situation is such that even on Earth, the rights of nature are often overlooked or violated. Therefore, before considering extending these rights to outer space, we must get them on Earth. Nonetheless, it is crucial to include the rights of celestial bodies and extraterrestrial environments in discussions about space exploration.

Danielle Wood

We don't need to wait until we discover extraterrestrial life to start considering the rights of other planets. Just because a planet may not harbor life doesn't mean we can freely exploit its resources or colonize it. Does the Moon have the right to exist without being transformed into a mining site or a base for other commercial activities? This is something we need to consider seriously.

What do you think is the role of art and storytelling in reclaiming the imagination of interplanetary kindred living?

Q12

Alvin Harvey

As a Native American, storytelling and art are our culture and history bedrock. From our songs and prayers to jokes and narratives, these elements serve as entertainment and avenues for passing down education and values. To achieve kindred coexistence on other planets, we must reevaluate and reeducate our values regarding colonization, frontierism, first contact, and resource exploitation. A compelling story can evoke moral action and even drive systemic change.

Nicole H'uiller

Art and storytelling are crucial in reshaping and amplifying the imagination surrounding interplanetary kindred living. They can not only shift perspectives but also tangibly affect decision-making spaces. As a bridge, art and storytelling can extend these discussions to a broader audience and include currently marginalized groups. Space is a common asset for all humanity, and everyone should have a say, not just those in privileged positions.

Danielle Wood

It's crucial to engage with experts in the space industry so that our narratives have a chance of influencing them. Currently, the space industry focuses mainly on the changes in astronauts' microbiomes, with little consideration for the ethics and rights of microbes. Bringing in this unique perspective is incredibly powerful. The challenge lies in crafting a narrative compelling enough to sway those in power.

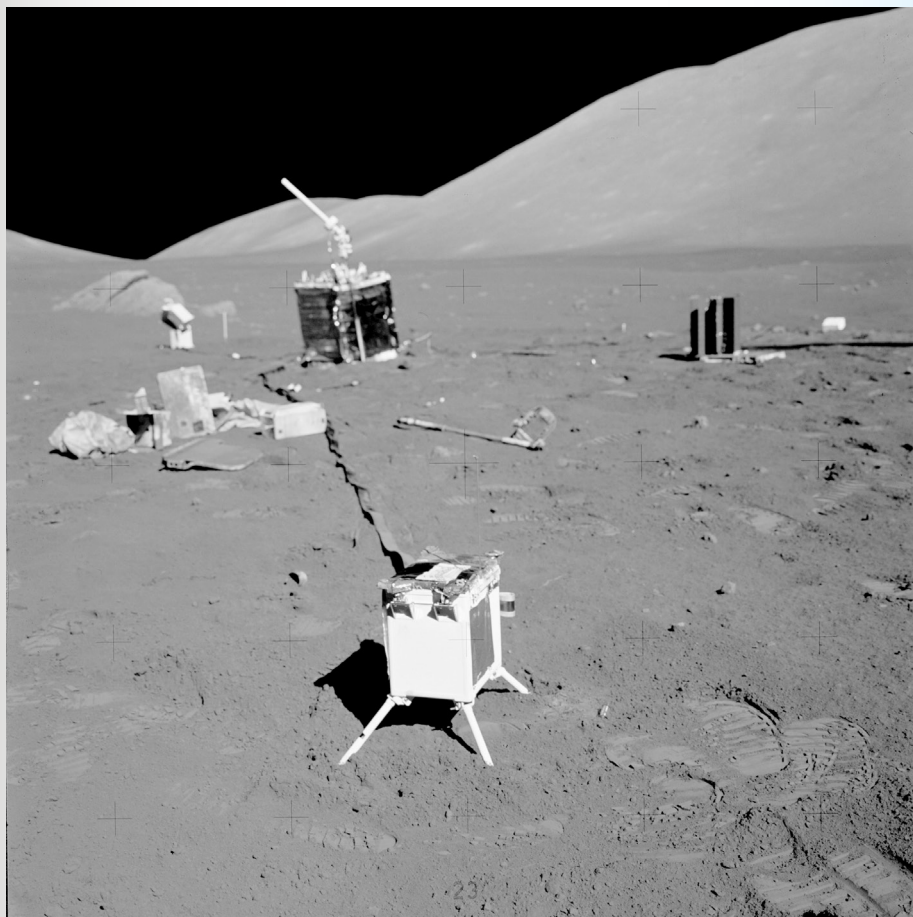


Photo credit: NASA

《與細菌混了 3000 年》

3000 Years Among Microbes

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《與細菌混了 3000 年》

3000 Years Among Microbes

自古以來，人類總是凝視著星空，探索宇宙奧秘和自然法則。自1957年蘇聯成功發射史潑尼克1號人造衛星以來，太空不再是遙不可及的幻想，而是人類文明的新邊疆。面對地球上的挑戰，太空探索及開發成爲一個現實選擇，但我們對跨星際親屬關係的理解卻仍待深化。透過影視、科技、藝術、文學和政策討論，我們不斷重塑和豐富對太空的想像，爲未來星際共生的生活樣態鋪路。此訪談集以共生的視角探索太空，展示三位太空產業不同背景參與者的獨特洞見，結合圖文資料，全面呈現人類對太空的多元觀點與視角。

Since ancient times, humanity has gazed at the stars, probing the profound mysteries of the universe and the inherent laws of nature. Since the launch of "Sputnik 1" by the Soviet Union in 1957, space has transitioned from a distant fantasy to a new frontier for human civilization. Faced with Earth's challenges, space exploration and development emerge as a tangible option, yet our grasp of interplanetary kindred living remains to be refined. Through cinema, technology, art, literature, and policy discussions, we constantly reshape and enrich our perception of space, laying the groundwork for future modes of interstellar coexistence. This collection of interviews explores space from the perspective of coexistence, showcasing unique insights from three diverse participants in the space industry, and, combined with visual and textual materials, offers a comprehensive portrayal of humanity's multifaceted views on space.