

BEFORE YOUR DISCUSSION

- Email an invitation to your book group members
- The following bookstores are offering 10% off the purchase of this book:
 - *King's English Bookshop in Salt Lake City*
 - *The Book Bungalow in St. George*
- **Beehive Spirits** (30 min) is available to stream at pbsutah.org/beeivespirits
- Join the Facebook Group "Book Club in a Box Discussion Group" to find ideas, helpful links, etc.
- During your discussion:
 - Make PBS Utah materials in the box available to the group
 - Show clips from the film
 - Take photos to share with PBS Utah and Facebook group

AFTER YOUR DISCUSSION

- Encourage your book club participants to fill out the survey
- Share your photos and ideas with others on the Facebook Group
- Invite your book club members to join the Facebook Group via email
- Complete host survey
(Link will be emailed to you after your discussion)

GET INVOLVED

You chose this box because you are interested in these stories and issues. Learn more about Mars and outer space by visiting these organizations' websites:

- **Clark Planetarium**
slco.org/clark-planetarium
- **Utah STEM Action Center**
stem.utah.gov
- **The Mars Society**
marssociety.org



NOVA: LOOKING FOR LIFE ON MARS

Follow along as NASA launches the Mars 2020 Mission, perhaps the most ambitious hunt yet for signs of ancient life on Mars. The spacecraft will blaze into the Martian atmosphere at some 12,000 miles per hour and attempt to lower the Perseverance Rover in the rocky Jezero Crater, home to a dried-up river delta that scientists think could have harbored life.

Perseverance will comb the area for signs of life and collect samples for possible return to Earth. Traveling onboard is a four-pound helicopter that will conduct a series of test flights — the first on another planet. During its journey, Perseverance will also test technology designed to produce oxygen from the Martian atmosphere, in hopes that the gas could be used for fuel — or for humans to breathe — on future missions.

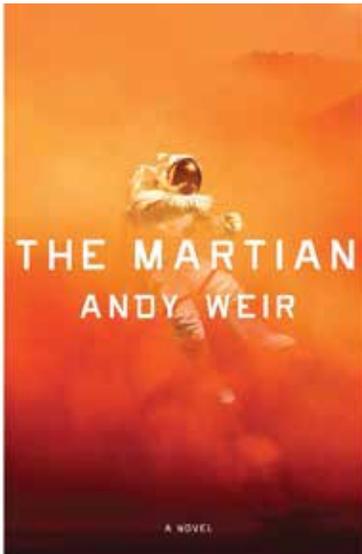


TERRI RANDALL Writer, Producer & Director

Terri has a B.F.A. in painting and art history from Carnegie Mellon University and an M.F.A. in fine art photography from Pratt Institute. She taught a workshop on personal filmmaking at Boston Film and Video Foundation and has also taught classes in documentary filmmaking at Montclair State University.

Terri Randall has written, produced and directed documentaries for more than 20 years. She’s received numerous awards for her work including an Academy Award nomination for her HBO documentary short *Daughter of the Bride* and a Primetime Emmy Nomination for Outstanding Children’s Programming for *What Kids Want to Know About Sex and Growing Up*.

Terri formed Randall Productions, Inc. in 1999. For more than a decade her company has produced hours for PBS/NOVA such as: *Treasures of the Earth-Metals*; *Rise of the Robots*; *How Smart Can We Get*; *Ground Zero Supertower* and *Death Dive to Saturn*.



THE MARTIAN

Mark Watney is one of six astronauts in the first week of a 30-day mission on the surface of Mars. A freak windstorm separates him from his crew mates and causes them to believe, with reason, that he is dead and unrecoverable. With their own survival in immediate peril, the remaining crew hastily abort their mission and begin the months-long return journey to Earth.

But Mark Watney is not dead. He is wounded and alone on Mars. No one is looking for him and he has no working radio. Mars has no water, planet life, or breathable air. The average daytime temperature is -100°. All Watney has is the hardware left behind by his comrades, his intelligence, education, training, and a fierce determination to not let Mars kill him.

Devoting himself to figuring out how to let Earth know he is alive and then to stay alive long enough to be rescued, Watney must confront the reality that any rescue cannot come for at least another fifteen months. *The Martian* is a story of courage, ingenuity, resiliency, and the tireless application of scientific and engineering skills in a unified effort to rescue a stranded astronaut.

ANDY WEIR Author

Andy Weir built a two-decade career as a software engineer until the success of his first published novel, *The Martian*, allowed him to live out his dream of writing full-time. He is a lifelong space nerd and a devoted hobbyist of such subjects as relativistic physics, orbital mechanics, and the history of manned spaceflight. He also mixes a mean cocktail.

Weir wrote *The Martian* to be as scientifically accurate as possible and his writing included extensive research into orbital mechanics, conditions on Mars, the history of manned spaceflight, and botany. Originally published as a free serial on his website, some readers requested he make it available on Kindle. First sold for 99 cents, the novel made it to the Kindle bestsellers list. Weir was then approached by a literary agent and sold the rights of the book to an imprint of Penguin Random House. The print version (slightly edited from the original) of the novel debuted at #12 on *The New York Times* bestseller list. A *Wall Street Journal* review called the novel "the best pure sci-fi novel in years." In 2015 it was adapted to film, starring Matt Damon and Jessica Chastain.



1. **OPTIMISM:** In the **NOVA** program **Looking for Life on Mars**, JPL engineer Elio Morillo Baquerizo supervises the “Optimism” rover, an exact part-for-part fully functional duplicate of the Perseverance rover. How would a working duplicate of Perseverance and JPL’s “Mars Yard” be valuable in planning operations and troubleshooting problems encountered by Perseverance? Compare the uses for the Optimism replica in support of the Perseverance mission to Mark Watney’s use of JPL’s 1997 Mars Pathfinder together with JPL’s mothballed replica of Pathfinder depicted in *The Martian*.
2. **DIVERSITY:** Baquerizo mentions the importance of being an Hispanic role model, and the **NOVA** episode itself makes it clear that NASA’s Mars 2020 team is ethnically and gender diverse. That theme of diversity is also present in *The Martian*. The Mission Commander, Lewis, is a woman. The Mission Pilot is named Martinez. NASA’s Director of Mars Operations is Venkat Kapoor, implying a South Asian ancestry. What will be the impact of this diversity on future space exploration?
3. **MOXIE:** In *The Martian*, Mark Watney refers to the “oxygenator” as a critical piece of equipment without which he cannot survive. He needs it to convert Mars’ atmosphere of unbreathable carbon dioxide into breathable oxygen. One of the experiments onboard the Perseverance rover is the Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE). This experiment tests the feasibility of converting Mars’ unbreathable atmosphere into breathable air by converting carbon dioxide (CO₂) into molecular oxygen (O₂). Here on Earth our “oxygenator” goes by another name - plants. Spacecraft launched from Earth can’t carry enough O₂ for a long stay on Mars – it would be far too heavy – so humans traveling to Mars will have to manufacture O₂ on site if they plan to stay for more than a few days. Historically, explorers of new frontiers have safely assumed that there water and food would be available to them as they traveled. When it comes to Mars, it is possible to produce, on site and from what Mars has to offer, air, water, and food — with the right technology. Beyond those basics, what else might astronauts on Mars want or need to have that is impractical to bring with them from Earth, and how might they go about obtaining them?
4. **LIVING OFF THE LAND** is an essential component of survival stories. Spend a minute or two discussing all the things that Mark Watney had to recycle or learn to manufacture for his survival and hope for rescue that Robinson Crusoe never has to worry about.
5. **AN ASTRONAUT’S PERSONALITY:** In my career I had the privilege of getting to know several astronauts.

They are an unusual category of people. In addition to being highly intelligent and well educated, they are first and foremost capable of intense intellectual focus, skilled at problem solving, even tempered, and generally optimistic about life. How would each of these traits be useful to a person stranded and alone on Mars?

6. The last sentence spoken in NOVA’s **Looking for Life on Mars** is, “The Blue Planet is going to the Red Planet and we’re going to be exploring it together.” How is *The Martian* an extension of that sentiment, and what to you is the significance of referring to us as “the Blue Planet” instead of as NASA, or the United States, or the European Space Agency?
7. **CONCLUSION:** On observing the high-def video of Perseverance successfully landing, a NASA engineer says “This is insanely awesome footage. James Cameron eat your heart out.” Why do you think he would he say that, and what does it mean to you? What is the long-term impact of shared joy, wonder, and accomplishment on a culture?

EXTRA CREDIT: Did you notice that the landing site for the sample return mission is the Great Salt Lake desert? Mars is coming to Utah! Your box includes more about this in an article from the Salt Lake Tribune. Incorporate this into your discussion if you like.



SETH JARVIS

Seth wasn’t born in Utah, but considers himself successfully assimilated. He built his first telescope at the age of 12 and has been an enthusiastic amateur astronomer ever since. Seth began working for Salt Lake City’s Hansen Planetarium as an usher in 1978. It

was a part-time job to earn rent and tuition money as he worked towards his 1981 Bachelor’s degree in Psychology from the University of Utah. The part-time job quickly became a passion and a career path. Usher, Cashier, Science Demonstrator, Star Theatre Lecturer, Science Education Specialist, Outreach Education Manager, Director of Education Programs, Associate Director, and finally, serving as the last Executive Director of Hansen Planetarium, which closed in December 2002. Seth was deeply involved in the planning, construction and transitioning of Hansen Planetarium staff and programs into the new and four times larger Clark Planetarium facility for which he served as Executive Director from its opening in April 2003 until his retirement in August 2019.



In the book *The Martian*, Mark Watney stays alive by eating potatoes. Keep your book group lively with this scalloped potato recipe from Martha Stewart's Cooking School on PBS.

Learn more at pbs.org/food

INGREDIENTS

3 pounds Yukon gold potatoes, peeled and sliced paper thin
2 ½ cups milk
1 clove garlic, peeled
3 tablespoons unsalted butter, softened
5 ounces Gruyere cheese, shredded
1 cup heavy cream
Coarse salt and freshly ground black pepper

INSTRUCTIONS

1. Preheat oven to 325 degrees with a rack set in the lower third of oven. Combine sliced potatoes and milk in a large saucepan over high heat. Bring to a boil and immediately reduce heat to low; cover and simmer until potatoes are just tender, about 3 minutes.
2. Place a colander over a large bowl and drain potatoes, reserving milk. Add heavy cream to milk and stir to combine.
3. Rub a 2 ½ -quart oval baking dish with garlic and 1 tablespoon butter. Arrange sliced potatoes, sprinkling cheese between the layers, in the baking dish; season with salt and pepper. Dot with remaining 2 tablespoons butter and pour reserved cooking milk and cream mixture over.
4. Transfer baking dish to oven and bake until cheese becomes deep golden brown and milk has reduced and thickened, 80 to 90 minutes. Remove from oven and let rest for 5 to 10 minutes before serving.

Yield: 20 servings