Article Word Count: 1,756 words

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| **Article Title:** | The Impact of Aging on Limb Regeneration (7 words) |
| **Author:** | By Ian Guang Xia '21 |
| **Article Teaser:** | Studying how aging affects bone degradation and formation in mice alludes to future advancements in regenerative medicine therapies for older patients. (21 words) |
| **Author Biography:** | Ian Guang Xia '21 is a biomedical engineering major with a minor in electrical engineering from San Antonio, Texas. Ian started conducting academic research at Claudia Taylor Johnson High School for his AP chemistry teacher during senior year, and carried that interest in academic research into his undergraduate studies. Ian plans to work in the software industry and possibly conduct research on current questions and issues he encounters there. (69 words) |
| **Pull Quote:** | Studying these vertebrates will allow us to identify mechanisms that could possibly be translated to induce limb regeneration in humans. (20 words) |
| **Pull Quote:** | To study this age-related decline of regenerative power, the digit tips of mice…were analyzed at different time points of their regenerative processes. (22 words) |
| **Pull Quote:** | …progeria significantly alters the timing and magnitude of both bone degradation and bone formation… (14 words) |
| **Example:** | Data generated through computer-assisted microtomography of the regenerating digits found that both bone resorption and bone formation were delayed in the digit tip bone of mice with progeria when com­pared to mice without it. This data is displayed in **Fig­ure 1**. The point of lowest bone volume occurs at 7–10 days post amputation (DPA) for mice without progeria while occurring at 10–21 DPA for mice with progeria. Before these specified time points, bone resorption or degradation is occurring as osteoclasts eat away at dam­aged bone structures near the wound site to clear away debris for bone formation to begin. Following bone resorp­tion, new bone is formed, and regeneration is completed at 28 DPA in healthy digits. As can be seen in **Figure 1C**, dig­its from progeria mice exhibit a much lower bone volume, which may indicate that proge­ria inhibits regeneration.  [figure]  ***Figure 1.*** *This figure shows a general schematic of* ***(A)*** *the distinct steps which occur in the process of digit bone regeneration in mice illustrated by how the bone looks during each phase, and* ***(B)*** *differences in minimal bone volume (smallest bone volume caused by bone resorption) and* ***(C)*** *final bone volume (bone volume at 28 DPA), relative to preamputation volume, between progeria mice and healthy control mice (WT). The dashed line indicates 50% of the pre-amputation bone volume in B and 100% in C. Each data point represents one digit while bars indicate the mean ± 95% confidence interval. BV means bone volume; DPA, days post amputation; WT, wild type.* |

Article Word Count: 1,993 words

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| **Article Title:** | Exploration of Technological Distractions through Dance (6 words) |
| **Author:** | By Madeleine Dardeau ’20 and Madelyn Klumb ‘20 |
| **Article Teaser:** | Visualizing the effects of technological devices on social interactions through dance. (11 words) |
| **Author Biography:** | Madeleine Dardeau '20 is a dance science major from Bastrop, Texas. After graduation, Madeleine plans to continue her studies of dance science and eventually work in a university teaching anatomy and physiology to dance students. In this career, Madeleine hopes to increase the longevity of dancers' careers by combining the art of dance with science. (55 words) |
| **Author Biography:** | Madelyn Klumb ‘20 is a dance science major from Jourdanton, Texas. She plans to continue her education by receiving a Master of Fine Arts degree at Sam Houston State University so she can reach her dream of becoming a dance teacher at a collegiate level. She hopes to help future students reach their dreams by providing a safe and creative learning space for them. (64 words) |
| **Pull Quote:** | Dance choreography was developed to reflect the usage of cell phones, smartwatches, laptops, and headphones. (15 words) |
| **Pull Quote:** | …the audience successfully identified movements that represented the interactions between individuals and technology. (13 words) |

Article Word Count: 1,918 words

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| **Article Title:** | Predicting the 2020 Election: How Voter Turnout Rates Affect Election Outcomes (11 words) |
| **Author:** | By William L. Wallace ’21 and Luke A. Sullivan ‘21 |
| **Article Teaser:** | Statistically predicting how voter turnout affects statewide election outcomes in an era of uncertainty. (14 words) |
| **Author Biography:** | William Wallace '21 is an economics major with a concentration in financial econometrics from Austin, Texas. William has always been deeply interested in American politics and political power, which inspired him to write this paper. For the past year, William has worked at the Texas A&M Public Policy Research Institute, and he plans to become a university professor. William is also pursuing a Master of Science degree in economics. (69 words) |
| **Author Biography:** | Luke Sullivan '21 is an economics major with a minor in business from Fair Oaks Ranch, Texas. Luke’s research began as a class assignment but was quickly expanded upon due to his interest in politics and the relevance of the election year. Luke was recently accepted to be a research assistant in the Texas A&M Department of Economics and will be assisting master’s students with their thesis. Luke plans to attend law school upon completion of his undergraduate degree. (79 words) |
| **Pull Quote:** | …Many statewide elections vary widely in their participation rates. (9 words) |
| **Pull Quote:** | Even with this narrow margin of victory, our model correctly predicted the outcome of the 2016 presidential election in Michigan. (20 words) |
| **Pull Quote:** | If the eligible voting population that votes increases by 1%, the likelihood of a democratic candidate winning the race increases by 2.13%. (22 words) |

Article Word Count: 2,062 words

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| **Article Title:** | Raman Spectroscopy: Protecting Animal and Human Health in One Dimension (10 words) |
| **Author:** | By Daniel Andres Garza '20 |
| **Article Teaser:** | Using Raman Spectroscopy to analyze animal feedstuffs and the development of a technique to classify and quantify the nutrient value in those feedstuffs. (23 words) |
| **Author Biography:** | Daniel Andres Garza '20 is a biomedical sciences major with a certificate in cultural competency and communication in Spanish from Roma, Texas. Daniel completed this research under the supervision of Dr. Timothy Herrman and Dr. Kyung-Min Lee. Daniel’s motivation for this research came from his interest in spectroscopic techniques, specifically in Raman spectroscopy in animal feed. Daniel’s goal is to earn his Doctor of Medicine degree and perform epidemiological research in the medical field. (74 words) |
| **Pull Quote:** | A Raman effect is a shift in light frequency caused by the vibration of sample molecules being stimulated with a laser pulse from a Raman spectrometer. (26 words) |
| **Pull Quote:** | The developed method is ultimately aimed at ensuring animals and humans are receiving adequate nutrition from their diets. (18 words) |

Article Word Count: 1,676 words

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| **Article Title:** | Integrating the Human Dimension in Infrastructure Resilience: A Case Study of Service Disruptions Caused by Hurricane Harvey (17 words) |
| **Author:** | By Natalie Coleman ’20 and Miguel Esparza ‘20 |
| **Article Teaser:** | The impact of natural disaster and hazards are progressively becoming more damaging to the infrastructure of communities, resulting in the need to allocate resources to hotspots. (26 words) |
| **Author Biography:** | Natalie Coleman ’20 is a civil engineering honors student with a minor in Hispanic studies and a certificate in international engineering. Since the spring of 2018, Natalie has been an undergraduate researcher in the Urban Resilience Lab where she has investigated the social impacts of infrastructure service disruptions caused by natural hazards. She has also participated in the Undergraduate Research Scholars program and served as an Undergraduate Research Ambassador. Natalie will be attending the civil engineering Ph.D. program at Texas A&M University. (82 words) |
| **Author Biography:** | Miguel Esparza '20 is a civil engineering major with a focus in structural engineering and a minor in Hispanic studies for community engagement from Cypress, Texas. Miguel was inspired to join the Urban Resilience Lab directed by Dr. Ali Mostafavi after participating in a program that highlighted the social disparities of a natural disaster. He plans to continue studying structural engineering and conducting research with the Urban Resilience Lab as a master’s student at Texas A&M. (76 words) |
| **Pull Quote:** | ...The analysis has the potential to effectively prioritize service recovery in the immediate aftermath of a disaster... (17 words) |
| **Pull Quote:** | …socially vulnerable groups were...located in regions of higher hardship. (9 words) |

Article Word Count: 2,068 words

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| **Article Title:** | Stay in Your Time Lane: How Thinking During A State of Boredom Tends to Stay in Either the Past, Present, or Future (22 words) |
| **Author:** | By Kristen Akin ‘20 |
| **Article Teaser:** | People who are bored normally think about the present, past, or the future but not all three. (17 words) |
| **Author Biography:** | Kristen Akin ‘20 is a psychology major with a minor in chemistry from College Station, Texas who went to A&M Consolidated High School. Kristen’s inspiration for this project came from her interest in how inmates put in solitary confinement cope with the accompanying boredom. Kristen is pursuing her master’s degree in forensic psychology in the fall of 2020 and plans to pursue a Ph.D. in the future. (67 words) |
| **Pull Quote:** | Understanding how thoughts relate to boredom could be instrumental in helping people cope with disorders like depression, substance use, or smoking. (21 words) |
| **Pull Quote:** | Preliminary results showed that participants rated boredom…and calmness…as the most strongly felt emotions after the twenty minutes. (17 words) |
| **Pull Quote:** | Based on our finding, we found that participants tended to think about the present while they were in a bored state. (21 words) |

Article Word Count: 2,484 words

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| **Article Title:** | What Do You Meme: A Look at Historical and Literary Imitative Humor (12 words) |
| **Author:** | By Amy Harbourne ‘20 |
| **Article Teaser:** | An analysis of the recurrent themes present in imitative humor across different temporal, and cultural, eras. (16 words) |
| **Author Biography:** | Amy Harbourne ‘20 is an English major from Brownsville, Texas. The motivation behind her research was to investigate the connection to past societies via parallel cultural nuances. She plans to continue her education in rhetorical discourse and teach others about the deep connection between rhetoric and everyday life. (48 words) |
| **Pull Quote:** | Precursors to the contemporary meme can be found in earlier forms of imitative humor. (14 words) |
| **Pull Quote:** | Just as a meme can go “viral”, so could a line from a play that someone heard in the globe in 1599. (22 words) |
| **Pull Quote:** | Material repeatability conceptualizes the idea that we as humans are not only predictable in our actions, but our likes, dislikes, and humor. (22 words) |
| **Example:** | [img]  ***Figure 2.*** *Quote From Man Stabbed, derivative of the What you Egg? Meme, knowyourmeme.com, author unknown.* |

Article Word Count: 2,338 words

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| **Article Title:** | Towards Carbon Neutral Industrial Parks (5 words) |
| **Author:** | By Farah O. Ramadan ‘21, Taha O. Kubbar ’20, and Elizabeth J. Abraham ‘20 |
| **Article Teaser:** | Making eco-industrial parks both carbon neutral and profitable through resource integration and optimization. (13 words) |
| **Author Biography:** | Farah Ramadan '21 is a chemical engineering major with minors in mathematics and chemistry at the Texas A&M Qatar campus. Farah is from Barja, Lebanon and attended the Bahrain Bayan School before moving to Qatar to attend college. As an undergraduate student, Farah joined a research team where she primarily studies process integration and system optimization. Farah plans to continue her research during her senior year and complete a master’s program after graduation. (73 words) |
| **Author Biography:** | Taha Kubbar '20 is a chemical engineering major at the Texas A&M Qatar campus. He is a Libyan-Canadian who enjoys performing research to increase his knowledge on the topic of study. Taha plans to pursue a master's degree and Ph.D. in chemical engineering. (43 words) |
| **Author Biography:** | Elizabeth Abraham '20 is a chemical engineering major at the Texas A&M Qatar campus from Kerala, India. Elizabeth has great interest in the field of optimization and sustainability, which led to her work as an Undergraduate Research Scholar utilizing process integration techniques to achieve sustainability through optimization. Elizabeth plans to continue exploring her research interests through graduate school and is pursuing a career in academia where she hopes to find solutions to achieve sustainability. (74 words) |
| **Pull Quote:** | Stationary sources provide a unique opportunity to capture large amounts of CO2. (12 words) |
| **Pull Quote:** | ...it is possible to achieve profitability and carbon neutrality through resource integration of various processes. (15 words) |
| **Example:** | ***Table 3.*** *Sensitivity analysis on plant capacity results for fluctuations in energy and material costs. In response to changes in variables, the model activated the plants to different capacities.*    [img] |

Article Word Count: 2,620 words

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| **Article Title:** | Multidisciplinary Perspectives on the Decision Processes of Surgical Candidates (9 words) |
| **Author:** | By Zachary J. Skrehot '21 |
| **Article Teaser:** | Using the Prospect Theory to address patient choices regarding surgical procedures. (11 words) |
| **Author Biography:** | Zachary J. Skrehot '21 is an accounting major with minors in psychology and economics from Spring, Texas who went to Klein Collins High School. After undergoing a series of spinal procedures, Zachary became interested in pain perception and disparities, and eventually started as a research assistant in the Mathur Lab at Texas A&M in April of 2019. Zachary plans to continue exploring research opportunities on topics surrounding surgery and health outcomes during his senior year and after graduation. (78 words) |
| **Pull Quote:** | Unnecessary invasive procedures are estimated to be responsible for the death of 30,000 Medicare recipients annually. (16 words) |
| **Pull Quote:** | …the burden of avoiding an unnecessary procedure falls heavily on the patient… (12 words) |
| **Pull Quote:** | It is the responsibility of our healthcare system to enable patients to make efficient decisions. (15 words) |

Article Word Count: 2,575 words

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| **Article Title:** | The Butovo Firing Range: A Commemoration of the Victims of Soviet Repression (12 words) |
| **Author:** | By Grace Dye ‘20 |
| **Article Teaser:** | An examination of the contemporary Russian government's failure to acknowledge the bloodstained past of the Butovo Polygon. (17 words) |
| **Author Biography:** | Grace Dye '20 is a double major in Russian and history from College Station, Texas. She began her research in order to display little-known elements of Russia's captivating history. After graduation, Grace hopes to earn her Ph.D. in Slavic studies and teach in higher education. Her ultimate goal is to help open Russian culture to Americans and create a better understanding of Russia as a whole, the way her teachers did for her. (73 words) |
| **Pull Quote:** | The church recognizes the significance of these sites without downplaying the role played by the soviet government. (17 words) |
| **Pull Quote:** | The Russian state has not been as active in commemorating Butovo victims. (12 words) |
| **Example:** | [img]  ***Figure 5.*** *Dome of the Church of the Resurrection at Butovo. Photo taken by the author July 2017.* |

In 1934, the NKVD appropriated Butovo Polygon and equipped it as a private firing range.**7** Formerly an estate, the firing range was walled off from the public and used to test military equipment before Order #00447. After Order #00447 was given in 1937, the range was modified to an execution site and mass burial ground. The NKDV chose Butovo because it was far enough from Moscow to perform killings in se­cret. At the time, many Russians did not believe Stalin himself was responsible for the carnage inflicted by Order #00447, so executions were usually concealed. The firing range operated as a “special object,” a code term among Stalin’s secret police for a secret execution site.**8** Moreover, Butovo became handy as a burial site. Moscow cemeteries had run out of room to bury all the dead from Stalin’s purges; however, Butovo provided plenty of space for the bodies. Because of its secrecy, later investigators of the site doubted the range was truly a burial mound. A team of archaeolo­gists disproved this theory in 1997. Victims buried in the firing range are still there to this day, their graves undisturbed.

Butovo has a total of 13 mass graves, each about a kilometer long.**9** The well-kept lawn is dotted with square mounds of earth heaped over the graves in order to distinguish them from the rest of the area. Because the NKVD kept detailed dossiers of its victims, including photos, much has been dis­covered about the identities of the graves’ occupants. These records detail a staggering number of bodies. Over 14 months, a recorded 20,762 individuals were shot at Butovo Polygon.**10** According to the archeol­ogists who confirmed these burials, the actual total might exceed 40,000.**11**

1. Nérard François-Xavier, “The Butovo Shooting Range,” sciencespo.fr, Section A, February 27, 2009, **https://www.sciencespo.fr/mass-vio­lence-war-massacre-resistance/en/document/butovo-shooting-range**.

2. Robert W. Thurston, *Life and Terror in Stalin’s Russia, 1934-1941* (Connecticut: Yale University Press, 1998), 47.

3. Michael Ellman, “Regional influences on the formulation and implementation of NKVD order 00447,” *Europe-Asia Studies*62, no. 6 (August 2010): 915-31, **https://doi.org/10.1080/09668136.2010.489254**.

4. François-Xavier, Section A.

5. For more information on show trials during the Stalinist purges, see George H. Hodos’s *Show Tri­als: Stalinist Purges in Eastern Europe, 1948-1956* and Eugenia Ginzburg’s *Journey Into the Whirl­wind*.

6. Oleg V. Khlevniuk, *The History of the Gulag: From Collectivization to the Great Terror* (Connecticut: Yale University Press, 2004), 147.

7. Olga Cherkaeva, “Turning Sites of Massive Re­pression into Memorials,” *Muzeológia a kultúrne dedičstvo,* vol. 6, no. 1 (2018): 71. **http://www.muzeologia.sk/index\_htm\_files/mkd\_1\_18\_Cher­kaeva.pdf**

8. Carleton College, “Butovo Polygon,” blogs.carleton.edu, accessed June 23, 2020, **http://blogs.carleton.edu/smokeofthefatherland/butovo-poly­gon/**.

9. Cherkaeva, 72.

10. Ibid.

11. Karin Christensen, *The Making of the New Martyrs of Russia: Soviet Repression in Orthodox Memory* (New York: Routledge, 2018), 150.

12. “Бутовский полигон--Русская Голгофа,” martyr.ru, accessed June 23, 2020, **https://martyr.ru/**.

13. Christensen, 146.

14. Ibid.

15. Ibid.

16. Cherkaeva, 73

17. Ibid., 73–4.

18. Ibid., 71.

19. Christensen, 151.

20. BBC Monitoring, “Service helps heal Russian Orthodox rift,” *BBC News* online, May 15, 2004, **http://news.bbc.co.uk/2/hi/europe/3717739.stm**.

21. See Figure 4 for photo example.

22. Krzysztof Sala and Trine Stauning Willert, *Rethink­ing the Space for Religion: New Actors in Central and Southeast Europe on Religion, Authenticity and Belonging* (Lund, Sweden: Nordic Academic Press, 2012), 217.

23. Veronika Dorman, “From the Solovki to Butovo: How the Russian Orthodox Church Appropriates the Memory of the Repressions,” *Labaratorium* vol. 2, no. 3 (2010): 434, **http://ecsocman.hse.ru/data/2010/10/21/1214790963/17\_eng.pdf**.

24. Steven Lee Meyers, “Moscow Journal; Father of K.G.B. Might Return to Headquarters,” *The New York Times*, September 17, 2002, **https://www.ny­times.com/2002/09/17/world/moscow-journal-fa­ther-of-kgb-might-return-to-headquarters.html**.

25. Christensen, 150.

26. Ibid., 156.

27. Dorman, 432-3.

28. Ibid., 43

Article Word Count: 1,634 words

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| **Article Title:** | Particle Detector for Low-Energy Heavy Ions (6 words) |
| **Author:** | By Karthik S. Rao ‘21 |
| **Article Teaser:** | Uncovering the mysteries of the universe through particle detection and analysis. (11 words) |
| **Author Biography:** | Karthik Rao '21 is a physics and computer science double major with minors in mathematics and cybersecurity from Mumbai, India. Karthik has performed undergraduate research since his freshman year, working on various topics ranging from molecular gyroscopes to particle detectors. After graduating, Karthik hopes to attend graduate school to pursue a Ph.D. in physics. (54 words) |
| **Pull Quote:** | Determining the rates of nuclear reactions that contribute to these processes constitutes a major part of nuclear astrophysics. (18 words) |
| **Pull Quote:** | Theoretically, this detector possesses high 2D position resolution and the ability to detect low-energy heavy ions... (16 words) |
| **Pull Quote:** | These experiments will give us further understanding into the origin of elements after the big bang. (16 words) |

Article Word Count: 350 words

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| **Article Title:** | The Populated Dreamworld (3 words) |
| **Author:** | By Francisco Anaya ‘21 |
| **Article Teaser:** | A digital depiction of a populated architectural drawing through the usage of the entourage in architecture. (16 words) |
| **Author Biography:** | Francisco Anaya '21 is an Environmental design major with a minor in Digital fabrication and product design from Houston, Texas. Francisco attended Energy Institute High School 2013-2017 before attending Texas A&M University. The research motivation stems from an interest in architectural drawings and attempting to produce something out of the norm while exploring the agency behind the architectural entourage. Francisco plans to attend graduate school for a master's in architecture after receiving his undergraduate degree. (75 words) |

**Volume 12 Averages**

### Articles

1,634-2,620 words

### Article Titles

3-22 words

### Article Teasers

11-26 words

### Author Biographies

43-82 words

### Pull Quotes

9-26 words

### References

5-28 citations