Journal of Humanistic Mathematics

Volume 9 | Issue 2 July 2019

Applied Scientific Demiurgy I – Entrance Examination Information Sheet

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Cover Page Footnote
Mario Daniel Martín is an associate professor of Spanish at the Australian National University in Canberra. In a previous life, he was a mathematician in Argentina. His latest novel, La inevitable resurrección de los cerebros de Boltzmann, was published by Ediciones Ayarmanot in Buenos Aires, and can be dowloaded at: https://www.edicionesayarmanot.com/p/la-inevitable-resurreccion-de-los.html Mario Daniel would like to acknowledge the help of Sarah St Vincent Welch and Emily Campbell, who helped him de-Spanish the English of this piece.

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Abstract

This document provides all the required information needed by aspiring demiurges to sit the entrance examination for the foundation course *Applied Scientific Demiurgy I* in the scientific stream of the *Bachelor of Applied Demiurgy* at the *Topological Hyper-university of Technological Cosmology*.

Keywords: Cosmology; The Mathematical Universe Hypothesis; The unreasonable effectiveness of Mathematics; Constants of Nature; Biogenesis; Demiurgy;

> *There exists a coherent theory of physics and mathematics that is valid and sufficiently strong and maximally describes its own validity and sufficient strength.*
>
> –Paul Benioff

Assigned Topic for the Entrance Examination: Setting up Potential Biophilic Bubbles.

Enrolment Requirements: Before attempting this examination, as well as those practical assessment items which rely on it in the first section of the course, candidates need to sign a declaration stating they will adhere to *the axiom that physical reality corresponds to mathematical reality inside a derived homogenous manifold* (please also see below the *Minimal Multiverse Configuration Requirements* section for details).

Even if they have previously committed to undertake procedures respecting *the pan-multiverse incompleteness theorems and the metalaws of mathematical physics* in previous courses, training demiurges must still sign the declaration in the examination enrolment form. This requisite is also compulsory for those candidates simultaneously enrolled in *Mythological & Magical Demiurgy I,* or for those deputising established and registered world-building deities who wish to obtain further scientific training by completing the course. *Refer to the List of Compulsory Preliminary Readings (List 1) corresponding to the applicant's base multiverse that are required before signing the enrolment form. Please also see the cautionary notes in the Appendix regarding expected outcomes and interventionist behaviour allowed in the examination and the rest of the training.*

Prerequisites to sit the examination: Successful completion of *Introduction to Demiurgy*, or demonstrated previous scientific world-building practical experience.

Summary of the Entrance Examination primary content: In this practical entrance examination, the basic abilities of creating potential biophilic multiverses will be tested, using the knowledge and skills mastered in previous courses or the trainee's practical experience. The main objective will be to create a big bang event with low initial entropy to favour the spontaneous emergence of carbon or silicon-based life within an average of 2.7182 timines. Other parameters to be optimised in the resulting toy sub-universe, such as the proton/neutron weight ratio, velocity of light in the void, $(\alpha, \alpha_g, \alpha_S, \alpha_W)$ vectors, and matter/antimatter asymmetry will also be examined. Additionally, feedback on the potential real-world applications of self-steering multiverses (or pertinent bubbles residing in a multiverse, or sub-universes) produced in the examination will be provided to successful applicants.

Minimal Multiverse Configuration Requirement: Trainees residing in original multiverses with more than 20 dimensions, or in multiverses without quaternion time dimensions are advised to complete a functional holographic transfer to the training multiverse default frame settings before attempting this examination. *For a list of permitted differential operators allowed in the default training manifolds, please refer to sub-exercise* $3-\epsilon$ *of* Introduction to Demiurgy*, paying special attention to dS and Anti-dS spaces. Consult also the list of compulsory readings (List 2) required before sitting the examination once the entry form is accepted by the hyper-university.*

Expected outcomes: On successful completion of this entrance examination, training demiurges will be able to demonstrate mastery of the following skills:

1. Identification of optimal parameter setting of weak-gravity and strong-force toy-model non-recurrent multiverses with standard inflation to create potential biophilic conditions.

2. Calibration of the proportion of hydrogen, helium and other chemical elements produced in early stages of big bang events derived from proto-quarks' plasmas of their choice, with the aim of obtaining an ever-expanding multiverse (or bubble) that avoids the risk of bang-crush recurrence or crippling steady-state conditions.
3. Setting of initial sub-multiverse $(\alpha, \alpha_g, \alpha_S, \alpha_W)$ vectors to obtain potential biophilic conditions in bubbles with at least 10^{80} baryons (or antibaryons).
4. Exercise independent teleological skills in a restricted cosmological nucleogenic landscape.

Hurdle Requirement Status: This is a hurdle requirement to properly enrol in the course. There are no exceptions nor positive discrimination conditions of entry to the training. Previous demiurgical practical experience will only count as a prerequisite to sit the examination for those applicants who have not completed *Introduction to Demiurgy* or equivalent courses at other hyper-universities. There are no appeals to the ultimate decision of the judging panel of the examination either, but multiple attempts at the examination are allowed (a maximum of 7, see below).

Obtaining at least a minimal biophilic multiverse (or bubble) in the first six successive attempts is required to progress to the actual enrolment and subsequent training, where eternal inflation and many-world techniques will be practised, based on the elementary skills demonstrated here.

Candidates who obtain an optimal biophilic multiverse (where biogenesis occurs frequently in one or more bubbles) within their first three attempts, will be fast-tracked to exercise 8-Υ, in the second section of the course, where they will be able to take a rest from the constant parametrising of initial conditions, and develop their remote administrative skills by fine-tuning a pre-existing life-populated clockwork multiverse. Those who fail to obtain a minimal biophilic multiverse by their third attempt at this entrance examination will be required to repeat/complete sub-exercises 4-e or 4-π of *Introduction to Demiurgy*, and wait at least 6.0221 timines before enrolling again in the examination. The requisite also applies to those who have already successfully completed these sub-exercises in the introductory course. *Refer to the information sheets of* Introduction to Demiurgy *sub-exercises for details, and consult List 3 of the bibliography before attempting the examination for the fourth time.*

As stated above, only seven attempts at the entrance examination are allowed. This normally takes place in two batches of three attempts each, separated by at least 6.0221 timines, within a total period of 23.1406 timines. A final attempt after the sixth unsuccessful trial is permitted but candidates should be aware that before their

final attempt they have to meet the judging panel and properly justify their reasons for persevering. Candidates who fail a seventh attempt (or whose world-building attempts last more than the total period stipulated above) are not allowed to reenrol in the exam, and there will be no exceptions. *Failure to pass this examination doesn't disqualify candidates to pursue the mythological stream of the degree. Consult the Entrance Examination Information Sheet for* Mythological & Magical Demiurgy I *to obtain further information.*

Rational and Teleological Background: In contrast to the scientific exercises in *Introduction to Demiurgy*, in which the number of black holes and the stabilisation of the omega parameter were not crucial for the successful completion of the scaffolded assembling procedure (or reference frames) of the bubbles, in this practical examination special care on setting the initial conditions is paramount, as the curvature of the toy multiverse produced in exam conditions needs to be flat or slightly hyperbolic to ensure a high probability of life emergence. While candidates can choose from a wide variety of dimensional configurations for the frame manifold of the exam, 3+1-space-time systems are suggested, at least in the first three attempts. This is mainly because higher dimension multiverses/bubbles containing imaginary time prevent electromagnetic waves from expanding uniformly without extensive fine-tunning, except in 17+4-systems like ours. However, trainees should be aware that experimenting with such complex designs is forbidden within the university hyper-space sphere until the successful completion of *Applied Scientific Demiurgy II*. Dimension certification by the judging panel is required before candidates can expand their plasma starter in each attempt at the examination. *The number of time dimensions needs to be lower than the number of physical dimensions in all trials, and the Coherence of Physics, Chemistry and Mathematics axioms should be respected throughout every attempt.*

Preparation and Ingredients: As in the world-building exercises sci-2-e to sci-2-μ of *Introduction to Demiurgy*, a μ-mix of assorted bosoms and leptons will be used to create the primordial atomic plasma to be expanded in the initial singularity. In contrast to the case of those exercises, however, colours and flavours need to be almost balanced to avoid protons decaying into neutrons in the initial phase. It is necessary to emphasise at this point that the balance cannot be exact, because the slight irregularities contained in the initial plasma burst (before adding the inflationary dark energy) need to provide for the seeding of black holes and their surrounding galaxies. While time compression and time acceleration is allowed, this is only possible in a relativistic fashion, that is, no tachyonic shortcuts are permissible. The velocity of light should also be constant, and remain the maximum velocity of subatomic particles within the exam toy multiverse throughout the exercise.

As usual, the space-time itself within the multiverse can be calibrated to expand at a higher rate than the velocity of light set in the initial parametrization, but candidates should be aware that big rips in the toy multiverses/bubbles cannot be corrected during the examination.

Materials Provided: While in previous world-building exercises sci-3-Λ to sci-6-Γ of *Introduction to Demiurgy* training demiurges were provided with a pre-mixed kit to create the primordial singularity for their toy multiverses, in this examination they must mix their own using a variety of proto-quarks of different massines. In particular, they will have to optimise the seeding proto-dihyperions, composed of two proto-quarks of each flavour, and use the knowledge acquired in previous exercises (or their practical scientific world-building experience) to avoid strangeness-changing weak interactions with Eightfold-Way symmetry violations, without resorting to introducing axion-like pseudoscalar bosons. In other words, the strong charge+parity problem must be solved generically by other means, and candidates must set those initial parameters on their own. Fine-tunning, however, is allowed. Training demiurges will be guided by the examination panel in further tunning of the parameters towards the narrow window that allows self-replicating derived entities to exist, among the wide variety of congenial multiverses that support the evolution of observers if they spawn a promising multiverse within the first six attempts at the examination. *In the seventh attempt, if it eventuates, candidates will have to perform the fine-tunning on their own.*

Additionally, the avoidance of sub-universes or bubbles that allow only the emergence of freak observers or disembodied brains should be attempted, parametrizing the relative massines of light proto-quarks, and the strength of the nuclear interaction after the primordial plasma cools down during the inflation procedure. Different classes of dark energy will also be provided, but demiurges need to identify which is the correct one for their seeding plasma. Trainees are free to choose if matter or anti-matter prevails in their derived multiverses.

In case gravitational irregularities eventuate, supplementary dark matter could also be added (in a non-recursive fashion). The default α value satisfying $[1/\alpha^2] = \pi^2 + 137^2$ is recommended initially, but it is the trainee's responsibility to calibrate the $(\alpha, \alpha_g, \alpha_S, \alpha_W)$ vector accordingly. Candidates will also have to determine the optimal tensor-to-scalar ratio to create the baryon (or anti-baryon) asymmetry, as well as the coupling between the gauge field and the inflaton to flatten the potential, in order for the right type of quintessential inflation to ensue.

No ghost rule and no time-loops requirements: Candidates must ensure to maintain a minimum mass, for all self-replicating entities created during the procedure. In more technical terms, for every self-replicating shape D_{ij} such that a trace

$D_i = \cup\{D_i\}_{j(t)}$ is finite within a time t_j, and for every measure μ used to quantify the trace mass-energy of the shape, the value of the measure must be non-zero, that is, $\mu(D_{ij}) > 0$ must entail for almost every j in a t_j calibration; and every function $T : S \to S$ used to calculate the time flow t_j should be measurable and not recurrent. In particular, it is expected that for the toy multiverse created during exam conditions $t_{\text{decay}} < t_{\text{recurrence}}$, that is, no time loops are allowed in the generated toy physics of the multiverse developed under exam conditions. No arbitrary naked singularities are permitted either, and attempts to bring self-replicating entities created in other multiverses using the holographic principle with procedures not endogenous to the developed multiverse would automatically terminate the examination and future attempts at it. The cosmic censorship conjecture must be fully respected during the exam, without recourse to higher-derivative gravity-yielding-curvature-inspired particles such as riccions, axions or tachions.

Pre-Examination Theory Attendance: As in all hurdle praxis of the degree, attendance to the pre-theoretical component of the examination is compulsory. In the obligatory theoretical introduction, a failed flat multiverse called YHWH's Rare Earth will be explored. The example will provide a practical cautionary tale to avoid the creation of multiverses where heavy chemical elements are produced in the furnace of hydrogen-helium stars which redistribute them in supernova explosions. Such a recursive setting delays life emergence by an average of 3.1416 timines, and usually runs the risk of producing ill-posed isolated self-loathing gamma-4 intelligences. While the emergence of such life-forms will qualify the applicant to enrol in the course, trainees who construct multiverses containing them will be required to complete the first section of the course using other sub-universes or bubbles with different initial world-building parameters, under the guidance of the training panel. Those applicants who have not completed *Introduction to Demiurgy* or equivalent courses in other hyper-universities will be able to familiarise themselves with the hyper-university multiverse generator after the pre-examination theoretical component. *Please note that at least the knowledge of Physics, Chemistry and Mathematics of certified type II civilizations is required to operate the multiverse generator autonomously, without extra training. Any extra scientific training required from a candidate counts towards the total period of 23.1406 timines within which the examination must be successfully completed. Refer to Lists 1, 2 and 3 of the provided bibliography for expected knowledge required in the introductory pre-examination theory session.*

Advance Standing: In extremely rare cases, candidates would be invited to enrol directly in *Applied Scientific Demiurgy II.* In such cases, they must demonstrate

that they are able to produce biophilic multiverse/bubbles without fine-tunning with at least two different parameter settings of the $(\alpha, \alpha_g, \alpha_S, \alpha_W)$ vector, without any panel assistance. If explicitly invited, training demiurges will be required to complete a minimum of three among the following seminars before enrolling in advanced courses of the scientific stream: *Steering from a distance; Auto-Kenesis: dissolving yourself into fertile vacuum energy; Set and Forget Biophilic Multiverses; Impersonal Demiurgy Revisited; Renouncing Control: emptying-out your participatory instincts; Teleological Restraint: the power of non-intervention; Letting-go of Interventionism: setting your derived creatures free to destroy themselves if this is what they are up to;* and *The Secrets of Non-Participatory Scientific Demiurgy.* The training panel will advise candidates which are the best seminars to complete, based on their examination results.

Appendix. Extra Information to be familiarised with before completing the enrolment form.

Disclaimer: As explained in the general course disclaimer, the hyper-university cannot guarantee the creation of intelligent life, and even less self-aware Promethean substructures with the procedures proposed in this course, or subsequent courses in the scientific stream of the degree. The training panel can only help candidates to set the right mathematical structures from which the physical and chemical conditions for intelligent life potential emergence are probable. The hyper-university has a proud record of training graduates who scientifically generated a wide variety of gamma-9 and gamma-10 intelligences, but previous performance cannot be used to predict future success, especially in the case of candidates who are required to undertake extra scientific training.

Cautionary Note 1: Nucleobase-seeding is permitted after the third unsuccessful attempt of the exam, using a different chirality from the chemical environment. However, no interventions creating intermediate entities who in turn seed life in the exam multiverse are allowed. Trainees interested in developing deities or pantheons of divinities on which the control of the derived life is deputised to sub-demiurges, avatars or semi-gods are advised to enrol in *Mythological & Magical Demiurgy I* instead. In particular, those trainees who have already completed courses in the mythological stream of the degree should be aware that arbitrarily collapsing the wavefunction of the derived multiverse to maximise the wellbeing of derived creatures *is forbidden.*

If intelligent life eventuates within 12.9064 timines of the exam procedures, we strongly recommend a non-interventionist attitude on the part of the aspiring demiurge to maintain the scientific ethos expected in this stream of the degree.

A detailed explanation of the risks of close involvement with gamma-derived creatures will be provided in exercise 9-Ω, in the third section of the course, where training demiurges will revisit the YHWH's Rare Earth model, and other similar models of defective multiverse spawning processes such as the Shiva dual creation-destruction biogenesis procedure and the hermaphrodite Roog auto-insemination method. There, they will explore cases where deities who misinterpreted the doctrine of Panentheistic Immanence (a doctrine supported by the hyper-university), and did not practice the required Kenesis, became involved in the minutiae of their derived creatures. They will also be trained in the circumspect use of the parametric version of the Sorcerer's Apprentice Untheorem. Therefore, extreme caution and epistemological restraint is required.

Cautionary Note 2: All multiverses, sub-universes and time-space bubbles created by unsuccessful candidates will be crushed at the end of the entry examination. As noted above, successful candidates will be advised if they are allowed to use the exercise multiverses produced during the examination in the rest of the course. If they or their auspicing organisations want to keep them, they will have to provide the universal address of a hyper-space hosting frame within 5.2917 timines of the course completion, and sign a declaration assuring the hyper-university that any cross-multiverse cosmological effects resulting from the exam / practice multiverses (or their homologous holographic projections) will be the exclusive responsibility of the hosting frame owner. It is also forbidden for these multiverses (or any other multiverse created with the hyper-university world generator) to be transferred to other training meta-spaces without the express consent of the hyper-university.

Type IV civilization leaders who plan to use this training to qualify as type V civilization self-emptied entities and want to use course materials in their hyper-space hosting frames for proselytising purposes must assure the training panel that their frames contain enough room for the subsequent manipulation of the multiverses/bubbles created in the examination (or subsequent training). This last requisite is especially important if, after completion of the course, they plan to allow the many-world interpretation of quantum mechanics in the ensuing parametrization of the inflation set and gauge tools on derived toy multiverses created in the hyper-university or if they want to use them as a base for eternal inflation procedures. *More information on these restrictions will be provided in sub-exercise 6-φ, in the first section of the training of this course.*

Preliminary readings available in your base multiverse or spatiotemporal bubble.[1]

Reading activities are required before completing the enrolment form, and the pre-examination theory session. A list of additional readings is also available at the end of the document.

List 1. Compulsory preliminary readings required before completing the enrollment form.

These are essential readings on the connexion between Mathematics and Physics / Chemistry. They represent the presupposed knowledge expected before signing the declarations that applicants must follow in the scientific stream of the degree. Candidates can also find self-assessment forms that will facilitate their personal monitoring of their own learning process and preparedness in the hyper-university examination information space. The amount of time estimated for the reading activities varies between 0.7297 and 1.6726 timines, depending on the candidate previous experience and whether or not the training demiurge has completed *Introduction to Demiurgy* before enrolment.

1. John D. Barrow, *The Book of Universes: Exploring the Limits of the Cosmos*, W. W. Norton, New York, 2012.

2. Christian Beck, "Axiomatic approach to the cosmological constant," *Physica A: Statistical Mechanics and its Applications,* Volume **388** Number 17 (2009), pages 3384-3390.

3. Paul Benioff, "Towards a coherent theory of physics and mathematics," *Foundations of Physics,* Volume **32** Number 7 (2002), pages 989-1029.

4. Paul Benioff, "Towards a coherent theory of physics and mathematics: The theory–experiment connection," *Foundations of Physics,* Volume **35** Number 11 (2005), pages 1825-1856.

5. Antonio N. Bernal, Miguel Sánchez and Francisco José Soler Gil, "Physics from scratch. Letter on M. Tegmark's 'The Mathematical Universe'," `arxiv.org` preprint (2008), available at https://arxiv.org/abs/0803.0944, accessed on July 12, 2018.

[1]Please note that these lists are automatically generated. If they don't correspond to your spatiotemporal coordinates, please thelephat immediately your relativistically closer algorithmic overlord.

6. Chris Clarkson, George Ellis, Julien Larena, and Obinna Umeh, "Does the growth of structure affect our dynamical models of the universe? The averaging, backreaction, and fitting problems in cosmology," *Reports on Progress in Physics,* Volume **74** Number 11 (2011), 112901.

7. Charles S. Cockell, "The laws of life," *Physics Today,* Volume **70** Number 3 (2017), pages 42-48.

8. Brian Cox, Robin Ince and Alexandra Feachem, *How to build a universe. Part 1,* William Collins, London, 2017.

9. George F. R. Ellis, "Cosmology and local physics," *New Astronomy Reviews,* Volume **46** Number 11 (2002), pages 645-657.

10. Jeremy L. England, "Statistical physics of self-replication," *The Journal of Chemical Physics,* Volume **139** Number 12 (2013), 121923.

11. Evgeny Epelbaum, Hermann Krebs, Timo A. Lähde, Dean Lee, and Ulf-G. Meißner, "Dependence of the triple-alpha process on the fundamental constants of nature," *The European Physical Journal A,* Volume **49** Number 7 (2013), pages 1-15.

12. Peter H. Fisher, and Richard H. Price, "The toy model: Understanding the early universe," *American Journal of Physics,* Volume **86** Number 4 (2018), pages 290-292.

13. O. Godart, and M. Heller, "Approach to scientific cosmology," *Astronomy Quarterly,* Volume **4** Number 14 (1982), pages 53-63.

14. H. F. M. Goenner, "What kind of science is cosmology?" *Annalen der Physik,* Volume **522** Number 6 (2010), pages 389-418.

15. Brian Greene, *The Fabric of the Cosmos: Space, Time, and the Texture of Reality*, A A Knopf, New York, 2004.

16. Alan H. Guth, "Eternal inflation and its implications," *Journal of Physics A: Mathematical and Theoretical,* Volume **40** Number 25 (2007), pages 6811-6826.

17. Colin Hamlin, "Towards a theory of universes: Structure theory and the mathematical universe hypothesis," *Synthese,* Volume **194** Number 2 (2017), pages 571-591.

18. Edward Robert Harrison, *Cosmology: The Science of the Universe*, Cambridge University Press, Cambridge, 1981.

19. S. W. Hawking, and Leonard Mlodinow, *The Grand Design*, Bantam, London, 2010.

20. Michał Heller, *Theoretical Foundations of Cosmology: Introduction to the Global Structure of Space-Time*, World Scientific Publishers, Singapore, 1992.

21. Norriss S. Hetherington, *Encyclopedia of Cosmology: Historical, Philosophical, and Scientific Foundations of Modern Cosmology*, Volume **1250**, Garland Publishers, New York, 1993.

22. Nobuyoshi Komatsu, and Shigeo Kimura, "Evolution of the universe in entropic cosmologies via different formulations," *Physical Review D,* Volume **89** Number 12 (2014), 123501.

23. Jeffrey Koperski, "Should we care about fine-tuning?" *The British Journal for the Philosophy of Science,* Volume **56** Number 2 (2005), pages 303-319.

24. M. Křížek, and L. Somer, "Excessive extrapolations in cosmology," *Gravitation and Cosmology,* Volume **22** Number 3 (2016), pages 270-280.

25. Andrei Linde, "Creation of a compact topologically nontrivial inflationary universe," *Journal of Cosmology and Astroparticle Physics,* Volume **2004** Number 10 (2004), 004.

26. Gaurang Mahajan, and T. Padmanabhan, "Particle creation, classicality and related issues in quantum field theory: I. Formalism and toy Models," *General Relativity and Gravitation,* Volume **40** Number 4 (2008), pages 661-708.

27. Chiara Marletto, "Constructor theory of life," *Journal of the Royal Society, Interface,* Volume **12** Number 104 (2015), pages 20141226-20141226.

28. Robert Matthews, "Spoiling a universal 'fudge factor'," *Science,* Volume **265** Number 5173 (1994), pages 740-741.

29. Emily Meller, "How to build a universe," *The Lifted Brow,* Volume **6** Number 30 (2015), pages 27-29.

30. Milton K. Munitz, "Scientific method in cosmology," *Philosophy of Science,* Volume **19** Number 2 (1952), pages 108-130.

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33. Roger Penrose, *The Road to Reality: A Complete Guide to the Laws of the Universe*, Jonathan Cape, London, 2004.

34. Martin J. Rees, *Just Six Numbers: The Deep Forces that Shape the Universe,* Basic Books, New York, 2001.

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36. A. Sornborger, and M. Parry, "Pattern formation in the early universe," *Physical Review D,* Volume **62** Number 8 (2000), 083511.

37. Sherman K. Stein, *Mathematics: The Man-Made Universe; an Introduction to the Spirit of Mathematics*, W. H. Freeman, San Francisco, 1963.

38. Leonard Susskind, and George Hrabovsky, *The Theoretical Minimum: What You Need to Know to Start Doing Physics*, Basic Books, New York, 2013.

39. Max Tegmark, *Our Mathematical Universe: My Quest for the Ultimate Nature of Reality*, Alfred A. Knopf, New York, 2014.

40. Sanil Unnikrishnan, Varun Sahni, and Aleksey Toporensky, "Refining inflation using non-canonical scalars," *Journal of Cosmology and Astroparticle Physics,* Volume **2012** Number 8 (2012), 018.

41. Sara Imari Walker, and Paul C. W. Davies, "The algorithmic origins of life," *Journal of the Royal Society, Interface,* Volume **10** Number 79 (2013), 20120869.

42. Mehdi Yazdanpanah, "Starting from scratch," *Physics World,* Volume **25** Number 11 (2012), pages 60-61.

List 2. Compulsory preliminary readings once the examination application is accepted by the university.

These items will facilitate informed discussion of relevant topics related to this examination in the pre-examination theory session. The amount of time estimated for the reading activities before the pre-examination theory session is 6.6741 timines. It is hoped that candidates will enjoy these readings while gaining perspective on the topics covered in the examination.

43. Anthony Aguirre, and Max Tegmark, "Multiple universes, cosmic coincidences, and other dark matters," *Journal of Cosmology and Astroparticle Physics,* Volume **2005** Number 1 (2005), 003.

44. Satadru Bag, Varun Sahni, Yuri Shtanov, and Sanil Unnikrishnan, "Emergent cosmology revisited," *Journal of Cosmology and Astroparticle Physics,* Volume **2014** Number 7 (2014), 034.

45. L. Balart, S. del Campo, R. Herrera, and P. Labraña, "Closed inflationary universe with tachyonic field," *The European Physical Journal C,* Volume **51** Number 1 (2007), pages 185-192.

46. Soumya Banerjee, "A roadmap for a computational theory of the value of information in origin of life questions," *Interdisciplinary Description of Complex Systems,* Volume **14** Number 3 (2016), pages 314-321.

47. John D. Barrow, *The Constants of Nature: From Alpha to Omega*, Vintage, London, 2003.

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49. John D. Barrow, "Varieties of expanding universe," *Classical and Quantum Gravity,* Volume **13** Number 11 (1996), pages 2965-2975.

50. John D. Barrow, and Timothy Clifton, "Exact cosmological solutions of scale-invariant gravity theories," *Classical and Quantum Gravity,* Volume **23** Number 1 (2006), pages L1-L6.

51. John D. Barrow, and Alexander A. H. Graham, "General dynamics of varying-alpha universes," *Physical Review D,* Volume **88** Number 10 (2013), 103513.

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61. Iver Brevik, "Brane viscous cosmology in the plasma era," *Astrophysics and Space Science,* Volume **355** Number 1 (2015), pages 179-185.

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List 3. Suggested additional readings once the examination application is accepted by the university.

These items complement list 2. They are marked as optional, but mastering the concepts in them may give additional chances of success to committed candidates. They could also provide important scientific training for those candidates who have not completed *Introduction to Demiurgy.*

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168. Eugene P. Wigner, "The unreasonable effectiveness of mathematics in the natural sciences. Richard Courant Lecture in Mathematical Sciences delivered at New York University, May 11, 1959," *Communications on Pure and Applied Mathematics*, Volume **13** Number 1 (1960), pages 1-14.

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List 4. Suggested additional readings for successful candidates.

These readings cover the topics to be expanded in the first two exercises of the course. They are provided here as guidance only, as the list may vary depending on the need of the student cohort. *Training demiurges who have successfully completed the examination in their seventh attempt will be required to undertake additional readings and meet the training panel before actually enrolling.*

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Acknowledgments

Mario Daniel would like to acknowledge the help of Sarah St Vincent Welch and Emily Campbell, who helped him de-Spanish the English of this piece.