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TOLERANZ

30.07.2023



Exsitorial

Liebe Exsi-Leserinnen und Leser

Wir machen weiter mit weiblichen Nomen, die auf «-nz» enden, als Thema für unser Magazin und präsentieren euch diesmal eine Ausgabe über **Toleranz**. So ein vielfältiges Thema bietet Platz für verschiedene Artikel, einer interessanter als der andere, um die neugierigen LeserInnen mit **merkwürdigen Fakten** zu füttern und die besinnlichen LeserInnen mit **Reflexionen** zu versorgen.

Als wissenschaftliches Magazin beschäftigen wir uns natürlich mit der fachlichen Bedeutung und dem Nutzen des Konzeptes der Toleranz, ein verbreitetes Wort, das für die Beschreibung von sehr vielen Phänomenen benutzt wird. Die Wirtschaft wird in Farkas' wissenswertem Artikel über **Risikotoleranz** zum Zug kommen, im Kontext von GameStop, der Investition, die fast zum Kult geworden ist. Unser einzigartiges **Experiment zur Untersuchung von Alkoholtoleranz** solltet ihr nicht verpassen, falls ihr noch nicht zu viele Berichte gelesen habt. Bei jenem Highlight dieser Ausgabe haben uns 20 Freiwillige geholfen, mehr von diesem so wichtigen Teil des Studentenlebens zu erkunden: dem Alkoholkonsum. Mit Leif tauchen wir ein in die Physik und in die Informationstheorie und erfahren, dass man

vielleicht auch **tolerant gegenüber Elektronen** sein sollte. Obwohl, man sollte diesen Artikel aufgrund seiner philosophischen Exkurse vielleicht schon in die zweite Kategorie einordnen:

Das Wort Toleranz ist natürlich im Kontext von Gesellschaften und Menscheninteraktionen schon mit einer sehr **spezifischen Semantik** belastet, die wir hier auch erkunden wollen. Schaut euch deshalb unbedingt den **Artikel von WiNS** an, falls ihr euch mit der Förderung von Toleranz in eurem eigenen Umfeld auseinandersetzen wollt. Für grösseres Nachdenken: Nonô's Artikel versucht, einen artistischen Blick auf die **Toleranz im Alltag** zu werfen. Verpasst auch nicht Lukas' Filmkritik, diesmal zum Klassiker *Intoleranz*, wenn ihr euch auf die Natur der Menschen besinnen wollt. Ein kurzes Review von dem nicht weniger berühmten Buch *Brave New World* von Daniel findet ihr ebenfalls. Zuletzt wurde in dieser Ausgabe der **Dr. Erich Meister interviewt**, mit zahlreichen Kommentaren über die ETH, Geschichten über die Vergangenheit und Tipps.

Wenn ihr eure **Toleranz gegenüber einem guten Rätsel** testen wollt, haben wir für euch noch einige Sudokus vorbereitet! Ich hoffe, eure **Lerntoleranz** wird von dieser Prüfungsphase nicht zu stark auf die Pro-

be gestellt, sodass ihr noch Zeit und Geist Liebe Grüsse,
für einige aufklärende Lektüren habt! Nonô

Nonô



Abbildung 1.1: Lugano, von Monte San Salvatore. Das ist der schönste Ort, den ich je in der Schweiz besucht habe! Hast du schon in deinen Reisen durch die Schweiz irgendwo eine schönere Landschaft gesehen? Schick sie uns an exsi@vcs.ethz.ch!

Präsi labert

Liebe VCS-Mitglieder, dies ist nun bereits die letzte Präsi-Kolumne in diesem akademischen Jahr, und wir stürzen uns alle in einen weiteren Sommer voller Lerntage. Bevor wir jedoch in die Lernphase kommen, möchte ich noch einmal auf dieses Semester zurückblicken. Wir hatten wunderbare **Austausche in London und Nijmegen**, spannende **Sustainability-Talks** und Exsi-Artikel, informative Wahlfach-Infoevents und natürlich viele weitere Anlässe. Neben den üblichen Events, die nach Tradition die Alkoholtoleranz von uns allen testeten, haben wir auch einen **Opernbesuch** und ein **Sportturnier** veranstaltet. Gemeinsam haben wir Formel 1 geschaut und **zum ersten Mal einen Retrosyntheton** organisiert. Alles in allem würde ich dieses Semester als äusserst erfolgreich bezeichnen.

Auf hochschulpolitischer Ebene haben wir uns weiter mit anderen Fachvereinen vernetzt, das Semesterfeedback überarbeitet und ihr könnt die neuesten Entwicklungen jetzt immer in unserem **HoPo-Newsletter** nachlesen. Ebenfalls haben

wir im Fachvereins-Rektoren-Gespräch die Themen **ChatGPT**, **Vorlesungsaufzeichnungen**, **die fehlende Bachelorfeier** und **die geringe Anzahl an Laborplätzen** angesprochen. Wir können nur hoffen, dass sich in Zukunft alles weiter verbessern wird und das Studium an der ETH exzellent bleiben kann.

Nun steht für die VCS erst einmal eine etwas ruhigere Zeit und für euch eine vermutlich äusserst lernintensive Zeit an. Ich wünsche euch für diese Lern- und Prüfungsphase nur das Beste und drücke euch fest die Daumen. **Gemeinsam schaffen wir das** und dann beginnt schon bald das nächste Semester, in dem wir wieder mit all unseren Angeboten für euch da sind.

Eure Annina

Annina Oswald



Toleranz

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Exsi

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Dr. Erich Meister im Gespräch

...über das PC-Praktikum, Programmiersprachen, Kalligraphie und das Paradies...

Léona Dorries, Nonô Saramago, Samira Neff Dr. Erich Meister ist seit 40 Jahren an der ETH, davon hat er 35 als **Organisationsleiter des PC-Praktikums** gearbeitet. Am Ende des Herbstsemesters, nach Übergabe der Rolle an Dr. Takuya Segawa, geht er in Pension. An einem schönen Nachmittag in Mai hat er sich mit Nonô in sein Büro gesetzt und über seine Erfahrungen an der ETH und seine Leidenschaften gesprochen, und Geschichten über früheren Zeiten erzählt.

Sie hatten hier an der ETH eine sehr lange Karriere, 40 Jahre jetzt. Was zeichnet die ETH in ihren Augen im Vergleich mit anderen Unis aus, und wieso sind Sie so lange geblieben?

Das ist gerade eine schwierige Frage in meinem Fall, weil ich keine andere Universität als die ETH kenne. Ich war immer hier. Das hat sich einfach so ergeben: Ich war noch im letzten Jahr meiner Doktorarbeit, als ich vom Institut das Jobangebot bekommen habe, die PC-Praktika zu übernehmen. Und später wollte ich mal einen Forschungsaufenthalt machen, in Moskau. Ich hatte auch schon alles, inklusive Visum, aber dann hat es nicht geklappt. Dann habe ich es nicht mehr versucht.

Was waren die besten Erlebnisse, die Sie hier an der ETH hatten? Das war sicher die Möglichkeit, dass ich das meiste realisieren konnte, was ich mir vorge-

nommen habe. Ich wurde nicht irgendwie eingeschränkt, es wurde mir nicht genau gesagt, ich muss es so machen und nicht anders, sondern **ich hatte sehr grosse Freiheiten**. Das ist schon ein grosser **Pluspunkt an der ETH**, die keinen Lehrplan für die Lehrveranstaltungen hat. Es ist schon erstaunlich, dass das gut funktioniert, und die Dozenten nicht einfach denken: «Ich mache ein Minimum, weil ich ja keine Vorschriften habe, also mache ich möglichst wenig». Ich glaube nicht, dass Sie so etwas im Studium erleben. Das ist ein gutes Zeichen, oder? Klar, da tragen sicher auch die Studierenden bei, weil sie nicht gross reklamieren oder sich immer beklagen oder immer auf Konfrontation aus sind. Zum Beispiel, dass sie finden, dass das eine schlimme Vorlesung sei, dass der Professor schlecht sei und alles falsch mache.

In der VCS wollen wir immer konstruk-

tiv sein. Wenn wir Kritik haben, haben wir normalerweise auch einen Vorschlag dazu. Was hatten Sie sich vorgestellt, als Sie das Praktikum übernahmen? Was konnten Sie dadurch verändern, dass Ihnen diese Freiheit geschenkt wurde? Als ich selbst noch Student/Doktorand war, war das PC-Praktikum etwa gleich organisiert wie es die anderen Praktika heute immer noch sind. Das heisst, es gab irgendjemanden, meistens war das ein Postdoktorand oder sogar ein Doktorand, der oder die für ein oder zwei Semester die Aufgabe bekommen hat, das PC-Praktikum zu organisieren. Sie können sich vorstellen, wenn Sie Doktorandin sind und jetzt neu auch die Organisation des Praktikums übernehmen sollen, dass Ihnen das nicht unbedingt Freude macht, weil das viel Zeit in Anspruch nimmt. Weil Sie keine andere Zeit haben, **kümmern Sie sich dann nur um die Organisation, nicht aber für Inhaltliches.**

Bei Semesterbeginn haben Sie die Liste der Studenten, und Sie teilen die irgendwie in Gruppen ein. Auch die Assistenten, die Sie vom Institut bekommen, müssen Sie jetzt den Versuchen zuordnen. Und wer macht die Instruktionen der Assistenten? Meistens einfach die Doktoranden, die die Praktikumsversuche im letzten Semester gemacht haben. Aber das führt

dann dazu, dass **das Wissen immer mehr verwässert wird.** Sie vergessen, dem Nachfolger dies oder jenes zu sagen, und der hat auch keine grosse Lust, sich das zu erarbeiten. Und auch die Apparaturen müssen gepflegt werden. Es ist ein grosser Aufwand für alle beteiligten Leute, aber das Resultat ist trotzdem nicht gut.

Die Assistenten reklamieren: «Wir haben so viel Arbeit mit diesen Dingen und niemand gibt uns gute Instruktionen». Und die Studenten beklagen sich auch: «Die Experimente funktionieren nicht und die Assistenten sind nicht gut». Und auch die Techniker, die sich um die Geräte kümmern, reklamieren: «Die Doktoranden wissen gar nicht, wie man die Apparaturen richtig bedient. Immer geht etwas kaputt und sie sagen, das funktioniert nicht richtig, aber das Problem ist, dass sie die Sachen nicht richtig anschauen».

So beschloss die Institutsleitung damals, dass sie jemanden brauchten, der **für dieses Praktikum vollamtlich zuständig ist.** Und das ist natürlich ein grosser Entschluss, weil das viel Geld kostet, eine Person zu 100 % einzustellen, die nicht noch dazu Forschung betreibt, sondern **nur Lehre.** Wenn Sie in diesem Department herumschauen, dann finden Sie praktisch niemanden, der so etwas macht, obwohl es so viele Praktika gibt. Mein

Doktorvater kam dann zu mir und hat mich direkt gefragt, ob ich interessiert wäre an einer Lebensstelle. Wie die Institutsleitung auf mich gekommen ist, weiss ich nicht. Ich war wohl einfach **im richtigen Moment die richtige Person**, im richtigen Zustand der Doktorarbeit: Nicht mehr am Anfang, aber auch noch nicht fertig. Ich wäre sonst in die Industrie gegangen und so war das natürlich plötzlich alles anders.

Das ist normalerweise so im Leben, oder? Zur richtigen Zeit am richtigen Ort zu sein. Ja. Ausserdem wurde ich schon Anfang fünftes Semester Vater. Und ein paar Jahre später kam das zweite Kind hinzu. Es war **schon gut, eine Lebensstelle zu bekommen, wenn ich schon zwei Kinder hatte**. Meine Frau war auch nicht unglücklich, dass es nicht plötzlich hiess, «wir machen jetzt einen Post-Doc in den USA», oder so etwas. Es hat gepasst, gerade im richtigen Umfeld.

Und mit der Frage, warum ich überhaupt in der physikalischen Chemie bin, war es fast ähnlich. Das war auch ein Zufall. Wieso? Ich hatte schon ein bisschen ein Flair für Physik auch, Chemie sowieso. Und dann dieser **Mix von Chemie und Physik hat mir eigentlich gefallen**. Ich hatte dann das Fortgeschrittenen-Praktikum in physikalischer Chemie gemacht. Ich hatte dort sehr gute Assistenten, die mir auch

ihr Labor gezeigt haben, und das fand ich total eindrücklich und interessant.

Worin haben Sie Ihren ersten Abschluss gemacht? Ich weiss nicht, ob es damals schon Bachelor hiess. Nein, das hiess Diplomstudium. Und das war ein sehr regulierter Studienplan, ähnlich, wie die Chemiestudierenden ihn jetzt auch haben. Da hatte man die Vordiplomprüfungen: Erstes Vordiplom nach einem Jahr, zweites Vordiplom nach fünf Semestern. Dann musste man sich entscheiden, in welche Richtungen man geht, und nachher hat man dann noch 2–3 Semester studiert. Im achten Semester hat man die Diplomarbeit gemacht und nach der Schlussdiplomprüfung war das Studium beendet. Ich habe es einen sehr guten Studienplan gefunden, und auch eine sehr gute Ausbildung. Trotzdem hatten wir auch in den Semesterferien noch Zeit, etwas anderes zu tun, als immer nur zu lernen. Das haben die heutigen Studierenden eben nicht mehr, **sie sind permanent im Prüfungsmodus**.

Sie haben gesagt, dass das Wissen im Praktikum irgendwie verloren gegangen ist. Haben Sie sich deswegen dazu entschieden, ein Praktikumsbuch zu schreiben? Wie war diese Erfahrung? Das war eigentlich so: Wenn Sie kein Buch schreiben, sondern das Skriptsystem ha-

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ben, dann sind Sie **permanent am Überarbeiten dieser Skripte**, sowohl in einer Vorlesung als auch in einem Praktikum. Als ich das Praktikum übernommen habe, gab es auch zu jedem Versuch eine Beschreibung der Theorie und eine Anleitung zur Messung. Das war alles früher mit Schreibmaschine geschrieben, und man musste das fotokopieren. Als ich das Studium begonnen habe, hatte noch niemanden einen Computer.

Ich musste alle diese Skripte zusammenstellen – aktualisieren eher weniger, weil das gab ja Arbeit – und hab dann das in die sogenannte Reprozentrale – eine Druckerei im HG unten – gebracht und gesagt, wie viele Stücke ich von jedem Exemplar bräuchte, vielleicht 150. Und das war dann am Schluss **ein Wagen voller Papier, ein Veloanhänger**, und ich diesen Wagen vom CHN ins HG und zurück gestossen. Das können Sie sich fast nicht vorstellen, das waren wirklich paketweise Skripte. Die hat man dann in einem Raum ausgelegt und die Studierenden konnten sich dort bedienen.

Das Problem mit der Schreibmaschine war auch, wenn es mal geschrieben war, und sie Änderungen machen mussten, hiess das, sie müssen jetzt einen grossen Teil neu schreiben und drucken es wieder und nächstes Semester wieder. Sie

sind permanent am Korrigieren und Überarbeiten. Ich war oft damit beschäftigt, am Skript Verbesserungen anzubringen. Dann habe ich mich einfach entschlossen, das Ganze einmal in einem Buch zu sammeln, weil **dann haben alle Studierenden alles auf relativ wenig Papier**.

Als Novum wollte ich ein Praktikumsbuch, das **möglichst vollständig mit tatsächlichen Messergebnissen von unseren Studierenden oder von mir** illustriert ist, die reale Situation zeigen, nicht nur so tun als ob. So etwas gibt es meines Wissens nicht. Dann hatte ich für ein paar Jahre wieder Ruhe vor diesem Stress, das immer wieder auf Semesterbeginn neu zu bearbeiten und neu zu drucken. Man konnte das einmal aufschreiben und in ein paar Jahren bei der nächsten Auflage ändern.

Ich würde es auch empfehlen. Wir haben damals als Studenten auch Lehrbücher bekommen. Und ich kann mich erinnern, eines war sogar nicht etwa vom Professor verfasst, der diese Vorlesung gehalten hat, sondern von Studenten. Sie haben ihre **Notizen aus der Vorlesung** mit dem Professor diskutiert und dann ein **Büchlein produziert beim Verlag der Fachvereine**. Wir waren glücklich, ein sehr gut gemachtes Skript zu haben, aber es war von Studenten geschrieben.

Das ist interessant. Ich finde, die VCS

hat die besten Zusammenfassungen an der ganzen ETH. Aber wir haben dann fünf verschiedene Zusammenfassungen für eine Vorlesung, die manchmal auch Fehler haben. Es wäre interessant, wenn wir mindestens für die Fächer des Basisjahres so etwas machen könnten. Und ganz analog betrifft das die Prüfungen. Immer wieder wollen die Studierenden Musterlösungen haben. Ich sage: «Nein, wir geben keine Musterlösungen bekannt, das sind Prüfungen». Aber wenn **interessierte Studierende solche Musterlösungen schreiben und mit uns besprechen** wollen, dann korrigieren wir das gerne.

Sie sind bei den Studierenden bekannt als der, der allen R beibringt. Aber Sie waren schon hier, bevor R und Personalcomputer überhaupt existierten. Wie hat sich das ergeben, wieso haben Sie diese Sprache gewählt? Das war auch so eine Art Zufall. In meiner Zeit kamen wir als Studenten zum ersten Mal in Kontakt mit Computer im PC-Praktikum, damals im fünften Semester, wir hatten dort bereits Auswertungen an einem Computer. Und die Programme waren damals **nicht mal auf Magnetband gespeichert, sondern noch auf Lochstreifen** – ein langer Papierstreifen mit Löchern drin. Den spannte man in einen Lochstreifen-Leser

ein setzte sich an einen Computer, der wie eine alte Schreibmaschine aussah. Er hatte auch eine Papierrolle, wo er draufschreiben konnte, aber keinen Bildschirm. Der Lochstreifen wurde eingelesen und man hatte dann das Programm, lineare Regression zum Beispiel. Dann musste man die Messdaten eintippen und **durfte keinen Fehler machen**, denn nachträgliches korrigieren war nicht möglich.

Später, Anfang der 80er Jahre, sind die ersten IBM-PCs gekommen. Und da war das Institut auch schon dabei, im Praktikum konnten wir mit solchen Computern die Auswertungen machen, mit fertigen Programmen, die man als Assistent geschrieben hat. Von da an ging es revolutionär schnell. Man hat viel Geld investiert, dass unser Praktikum auch schon früh computerisiert war.

Dazu kam natürlich die Frage, was wir für die Auswertung verwenden sollten. Es gab immer das Dilemma. **Jeder Assistent benutzte in seiner Forschungsgruppe etwas Anderes**, jeder Studierende konnte was Anderes, und das hat sich einfach nicht getroffen. Viele konnten gar nichts. Es gab keinen gemeinsamen Nenner. Die Leidtragenden sind dann die Studierenden. Immer wieder mussten sie eine neue Programmiersprache oder ein neues System kennenlernen.

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Dann kam eines Tages eine Pharmaziestudentin bei mir im Büro vorbei und hat gefragt: «Ist es auch erlaubt, die Auswertung mit R zu machen?» Sie hat mir erklärt, dass sie R im Statistikkurs hatten. Dann habe ich das angeschaut und am Anfang war es etwas mühsam... dann plötzlich habe ich gemerkt: «Wow, das ist aber wirklich toll, was man da alles machen kann!» Es hat interessante Datenstrukturen, ergibt perfekte graphische Darstellungen, und es ist nicht so schwierig.

Ich habe das dann bald einmal sogar als intuitiver und praktischer empfunden als MATLAB. Es ist *Open Source* und läuft auf allen Betriebssystemen gleich. Aber das war schon ein schwieriger Prozess. Anfangs konnte es praktisch keiner der Assistenten, weil jeder in seiner Gruppe eine andere Programmiersprache benutzte. Es kamen nonstop Studierende mit dem Laptop: «Wie geht das? Wie können wir das machen? es funktioniert nicht!», und ich war permanent am Erklären. Das ist heute viel besser. Mit den Jahren wurden die ersten Studenten, die wir im Praktikum hatten und das gelernt haben, dann auch zu Assistenten. Heute können das eigentlich fast alle einigermassen.

Es ist nicht einfach, wenn man am Anfang vom ersten Semester ist und schon am

Ende der zweiten Semesterwoche diese Auswertungen in R abgeben muss. Aber wenn ich die Berichte von der Zeit vor R mit denen von heute vergleiche, wenn ich die Grafiken anschau und die Texte lese, das ist eine unglaubliche Qualität, schon im ersten Semester.

Heutzutage muss man als Naturwissenschaftler eine Programmiersprache können, egal welche. Später, in der Industrie und in der Forschung, wird das gebraucht. Programmieren ist eine Kompetenz, die immer mehr gefragt ist. Nicht notwendigerweise R, aber wichtig war mir einfach, dass es gratis ist. Nicht wie MATLAB, bei dem man ein VPN zur ETH haben muss, und wenn man später nicht mehr an der ETH sind, dann ist alles weg. Als Privatperson können Sie es sich wahrscheinlich gar nicht leisten.

Ja, ich bin auch nicht so ein Fan von MATLAB. Ich bin mehr eine Python-Person. Ja, wenn ich jetzt mein Nachfolger wäre, würde ich ganz klar auch Python noch zusätzlich lernen. Das ist wieder eine ganz wichtige Programmiersprache, die sehr verbreitet ist, die überall eingesetzt wird und auch sehr einfach zu lernen ist. Wer das kann, ist automatisch wieder im Vorteil. Also das würde ich unbedingt empfehlen.

Wie war eigentlich der Übergang zu Ih-

rem Nachfolger, Takuya Segawa? Der läuft sehr gut. Ich bin überzeugt, dass Takuya dieses Praktikum sehr gut machen wird. Er hat auch den grossen Vorteil, dass er ein Postdoc gemacht hat, er war schon in Lausanne, er war in der Physik. Er hat vieles gesehen, das ich nicht gesehen habe, **er hat einen breiteren Background**. Dieses eine Jahr wird ein Übergang, in dem wir zusammen arbeiten. Das ist auch für ihn super gut. Er kann jetzt in Ruhe verschiedene Experimente ausprobieren. Und dann steht er nicht so unter einem grossen Druck. Es gibt vieles, was schon vorbereitet ist – alle diese Aufgabenstellungen, die kann er übernehmen oder nachher in Ruhe überarbeiten. Hier muss ich auch wieder unserem Institut danken, **das ein Jahr vorher jemanden bestimmt, angestellt und bezahlt hat**, um parallel zu mir diese Arbeit zu machen. Dies ist nicht selbstverständlich.

Und jetzt, wenn Sie pensioniert werden, haben Sie schon Pläne, was Sie tun wollen? Gibt es irgendetwas Spezifisches, auf das Sie sich fokussieren wollen? Ja, natürlich. Ich werde sicher in der Kalligrafie vermehrt arbeiten wollen und werde auch wieder mehr Kurse besuchen, auch international. Früher war es eine Zeit, da besuchte ich in den Ferien einen einwöchigen Kurs. Und das werde ich

gerne wieder machen, wenn das möglich ist. Sonst mache ich keine grossen Pläne, es kommt sowieso immer anders. Es hat sich in den letzten Jahren gezeigt, dass man flexibel sein muss. Man muss sich auf diese Situationen einstellen können.

Können Sie vielleicht ein bisschen mehr über ihre Leidenschaft, die Kalligrafie, erzählen? Ich habe mir schon immer gerne alte Bücher, Schriften und Handschriften angesehen. Irgendwann hat mir meine Frau einen **Kurs in Kalligrafie** geschenkt, an der Volkshochschule in Aarau. Da hat man Buchstaben geschrieben, mit Feder und Tinte, und man hat versucht, irgendeine Vorlage abzuschreiben. In der letzten Stunde hat uns der Lehrer dort gesagt, dass er eine Überraschung für uns hätte, nämlich eine Kalligrafin, die das professionell macht. Die hat eine ganz spezielle Schrift geschrieben, die englische Schreibschrift, die mit einer spitzen Feder geschrieben wird und von sehr **feinen Linien und breiten schungvollen Schwelzügen** lebt. Es sieht ähnlich aus wie die Schnürlischrift, aber natürlich noch viel eleganter.

Als sie schrieb, hat es **gekratzt und getönt, wie die mit der Feder über das Papier strich**, und dann hat es gelegentlich auch gespritzt, was noch sehr dekorative Effekte ergab. Das war so toll zuzuschauen,

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dass fast jeder dort im Kurs gesagt hat, «ich mache weiter, ich buche wieder einen Kurs bei dieser Frau». Ich bin heute noch 30 Jahre später in einem Kurs bei ihr. Sie hat mir schon früh empfohlen, nicht nur bei ihr Kurse zu buchen, sondern auch bei anderen Kalligrafen. Ich habe dann einfach immer ein bisschen geschaut, wo es interessante Kurse gibt, und so bin ich an verschiedenen Orten gewesen und habe **bei verschiedenen Kalligrafen solche Kurse besucht**, einige sind heute sogar weltberühmt.

Für mich persönlich wichtig ist, ich möchte ein Hobby pflegen, das mich etwas fordert, aber das nicht einen grossen CO₂-Fussabdruck macht. Ich will es auch **mit meinen Händen machen**, nicht mit irgendeinem Computerprogramm, das mir eine schöne Schrift macht. Ich will diese Schrift selber schreiben und weiterentwickeln können.

Gewisse Dinge kann man lernen, und dann weiss man wie, aber man kann es noch nicht. Es braucht Training. Kalligrafie ist genauso. Und es ist optisch noch schön. Dürer hat einmal geschrieben: «Wir sehen gerne schöne Dinge, dann gibt es uns Freude». Andere machen Musik, und das braucht auch viel Übung, oder sie machen eine andere Kunst, und das braucht einfach Zeit und Ruhe. Solche

Dinge können Sie nicht einfach so, **Sie müssen üben, und Sie machen Fehler**.

Das hat auch mit Selbstkritik zu tun, und zum Glück haben einigen Kalligrafen mich wirklich sehr stark kritisiert. So lernt man unglaublich viel, weil sie erklären dir dann, wie man das **besser machen kann, worauf man achten muss**. Aber es braucht Zeit und Übung, um besser zu werden. Ich mache gelegentlich Auftragsarbeiten, aber am meisten mache ich eigentlich Briefkuverts, auf Geburtstage oder Weihnachten oder so. Das ist etwas, was Freude macht. Keine grosse Kunst, sondern einfach etwas, was individuell ist, ein Einzel exemplar. Und ich bekomme die auch sehr gerne von anderen Kalligrafen.

Denken Sie, dass jetzt, wo Sie weggehen, ein bisschen in der Geschichte bleibt? Es war eine gute Zeit, würde ich sagen, aber ich spüre jetzt auch, es ist gut so. Umso mehr, dass ich einen Nachfolger habe. Wenn ich jetzt hier wäre und immer noch denken müsste: «Was kommt nach mir? Wahrscheinlich ist die ganze Arbeit einfach weg, und irgendjemand kommt und muss da ganz wieder von neu beginnen», dann wäre es schon schlimm. Es kommt hinzu, dass wir jetzt seit ein paar Jahren einen sehr guten Elektroniker haben für das Praktikum: Thiago. Wenn ich eine Reparatur habe, schaut er sich

das an und am nächsten Tag ist es schon repariert. Es ist schön, so jemanden zu haben. Dasselbe ist mit irgendeinem mechanischen Bauteil. Sie müssen eine neue Apparatur bauen, Sie brauchen Unterstützung von der Werkstatt. Und die haben wir hier. Die ist auch unglaublich schnell.

Definitiv. Ich arbeite gerade in der Barnes-Gruppe, manchmal brauche ich ein spezifisches Teil und dann gehe ich einfach in den Mechanics Workshop und spreche mit jemandem und er macht mir das sofort. Das ist aber auch wieder unser Institut. Wir haben diese Kapazitäten hier. Wir haben Werkstatt, wir haben Elektronik, alle Gruppen haben solche Leute, und das geht so ohne grosse Administration. Ich muss mich nicht irgendwo in einem Büro anmelden, sondern ich gehe direkt, wie Sie auch, in den Mechanics Workshop und spreche mit den Leuten, «ich möchte das so und so». Vielleicht kommt jemand sogar ins Labor und schaut sich das an, und innerhalb kurzer Zeit habe ich das. Wenn ich das höre von anderen Leuten, die im Ausland waren, Postdoc gemacht haben – auch in so berühmten Orten, MIT, Stanford und so weiter – sagen sie, «aber hier, hier haben wir das Paradies. Das andere ist zwar berühmt, aber das Paradies ist hier». **Es ist schön, dass Sie fühlen, dass Ihre**

Arbeit hier Sinn gemacht hat und irgendwie verewigt wird. Ich weiss nicht. Das müssen Sie entscheiden als Studentin, Sie müssen das ja erleben. Aber ich würde nicht behaupten, dass unser Praktikum irgendwie schlimm sei oder dass wir zu viel von ihnen verlangen oder dass alles chaotisch und schlecht ist.

Ich meine, vielleicht könnte es mehr als 10 KP bekommen. Das ist aber ein Problem, dafür kann ich nichts... Diese Kreditpunkte, das ist ein politisches System. Wenn Sie da etwas ändern wollen, haben Sie immer Streit. Ich sehe, zumindest für die ETH, keinen Vorteil an diesem ganzen Bologna-Kreditpunktesystem, das wir jetzt hier pflegen. Es ist einfach ein administrativer Aufwand.

Früher war das Argument, dass es unseren Studierenden, oder den Studierenden ganz allgemein, dann erlaubt, die Hochschule im Studium zu wechseln. Wer macht das? Wie viele? Ja, praktisch niemand. Warum nicht? Ja, weil die Ausbildung hier so super gut ist. Da gehen Sie doch nicht an eine andere Hochschule, wo das vielleicht schlechter ist. Ausser eben, Sie haben andere Ziele, wie die Sprache, aber es ist kein Argument, das studienbedingt ist.

Haben Sie zum Schluss einen Tipp für junge Leute, die noch nicht so viel er-

lebt haben, in dieser Welt der Akademie und des Studiums? Ich glaube, man soll einfach offen bleiben für das, was kommt. Das tun, was einen auch speziell interessiert. Mit Freude tun, und **nicht zu früh immer denken, dass man das nicht brauchen wird**. Es kommt im Leben so oft völlig anders, als man sich das vielleicht einmal denkt. Als ich angefangen habe zu studieren, hatte ich keine Ahnung, in welche Richtung ich gehen werde. Plötzlich kommt irgendetwas, das ändert alles, wie das bei mir der Fall war, als Student plötzlich Vater zu werden. Oder man hat vielleicht einen sehr guten Assistenten, der einem sein Labor zeigt. Dann kommt man dort hinein und denkt, «Wow, das ist genau das!». Und wenn die Professorin oder der Professor auch noch passt, und dann hängt man plötzlich dort fest. Wahrscheinlich würden die meisten, die hier doktorieren, wenn man sie fragen würde, «warum bist du genau hier?», sagen, **eigentlich ist es ein Zufall**. Sie haben einfach die **Chancen des Lebens ausgenutzt**. Darum kann man nicht zu früh schon denken, es gibt nur dieses. Aber ich weiss nicht, ob man sonst viele Tipps geben kann.

Das ist schon ein kleiner Tipp. Was denken Sie, das man als Tipp geben könn-

te? Sie sind jetzt im vierten Semester, oder? Jetzt kommt jemand von der Mittelschule und will einen Tipp. Was würden Sie sagen? Was ist wichtig, wenn man hier studiert?

Ich finde, es ist wichtig, neugierig zu sein. Das ist vielleicht ziemlich persönlich, aber ich meine, das hilft immer, wenn man so ein naturwissenschaftliches Studium macht. Oder irgendetwas, das wie an der ETH technisch sehr schwierig ist. Mir macht es Spass, Fragen zu stellen und mehr Sachen herauszufinden und zu verstehen. Wenn man die Einstellung hat, dass man zum Lernen hier ist, wird alles einfacher, als wenn man das als Pflicht sieht. Ein Wort, das immer wieder gebraucht wird an dieser Hochschule, ist Karriere. Das ist ein Wort, das würde ich nie gebrauchen, weil es als sehr einseitige berufliche Laufbahnentwicklung wahrgenommen wird. **Ich rate ab, immer an Karriere zu denken.** Das kommt automatisch, wenn man sich engagiert. Es ist völlig egal, wo man doktoriert hat; hier an der ETH spielt das überhaupt keine Rolle.

Danke für das Interview!



Factors Influencing Blood Alcohol Level in *Homo sapiens studierens*

Or: getting our classmates drunk to see what happens

Nonô Saramago

Introduction

One of the world's oldest and most widely used drugs, ethanol, commonly called by what in chemistry would actually be the name of the compound's functional group, alcohol, acts as a depressant psychoactive drug in humans. Alcohol is typically produced for human consumption by sugar fermentation, a metabolic process most commonly found in yeast. If a higher alcohol volume percentage is desired, the fermentation process is followed by distillation.

Alcohol is used as a recreational drug for its dualistic stimulating and sedative effects, which mostly make humans feel good¹. Although its effects vary depending on the person and the dosage, it makes its consumer feel more relaxed, enthusiastic, and makes them worry less. At higher doses, more negative effects are accentuated, like [drowsiness](#), [nausea](#), [amnesia](#), [high risk of calling your ex](#), etc. While the amount of blabbing and uprightness

are decent measures for one's drunkenness, today's technology allows more precision by quantifying the amount of alcohol in the blood through the blood alcohol content (BAC), measured in millilitres per litre, i.e. ‰.

As a generalized depressor of the central nervous system, it also causes aggressivity and lack of decision-making as well as loss of motor coordination and sensory impairment, which leads to it being one of the largest causes of accidents, especially while driving. Plus, alcohol consumption leads to dehydration and side effects such as headaches and nausea, typically the day after in so-called hangovers. Excess alcohol is also shown to be linked to the incidence of various diseases, especially liver and brain damage, but also cancer and even infectious diseases². An overdose of alcohol (above 4 ‰) can be fatal, and [the addictiveness of the substance potentiates its negative effects on the individual and society](#).

Although there are recommended dosages and BAC levels above which you shouldn't

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do things like driving or above which you risk suffering from intoxication, different people can drink varying amounts of alcohol to get the same BAC, and have different physical and psychological effects at the same BAC. The BAC is typically calculated with the **Widmark** formula:

$$\text{BAC} = \frac{V\rho}{mr} \quad (4.1)$$

where V is the volume of alcohol consumed (i.e. total beverage volume · alcohol percentage), ρ is the density of alcohol, $0.8 \text{ kg} \cdot \text{L}^{-1}$, m is the weight of the consumer and r is the retention factor, or Widmark factor, estimated to be 0.68–0.7 for men and 0.55–0.6 for women and teenagers. The degradation of alcohol in the body occurs at a rate of 0.1–0.2‰. This study has the objective of investigating these differences and quantifying the factors influencing them.

Materials and Methods

Chemicals and Apparature

Diverse solutions of ethanol in different concentrations were used: 40 % Ethanol (Vodka), 35 % (Jägermeister), 10 % (white wine) and 4.8 % (Lager Beer). Bread and cucumber were used as solid-state sources of carbohydrates and dietary fibres.

A *Salter* body analysis weighting device and an *Ace A Fuel Cell* Breathalyzer with $\pm 0.075 \text{ ‰}$ accuracy were used.

Procedure

For every subject, data on age, height and gender were anonymously collected, and body weight, body fat percentage and body water percentage were measured with the weighting device. Subjects were not required to take off their clothes. Alcohol consumption volume, solution type and time were recorded in detail. The amount consumed by each subject was decided by the subjects themselves. In intervals between alcohol consumption, subjects waited 15 minutes without drinking any alcohol-containing beverages, cleaned their mouth with water and were subjected to a test with the breathalyser. Results and respective times were also notated.

Results and Discussion

The data was processed and analysed in R and Python by Etienne Mathier and Yoel Zimmermann. A ridge regression was used to attempt a time series regression of the collected data. This was, however, not significant, due to lack of enough data points.

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As we failed to produce our own model using the different factors measured from each participant, the last resort was using the traditional Widmark model and analysing the fit to our data.

Unfortunately, for some participants, even when including a function for alcohol degradation of 0th order, the theoretical calculations with the Widmark formula yielded unrealistically high values for the BAC level, which diverged too much from

Difference of predicted BAC vs measured BAC compared to food group

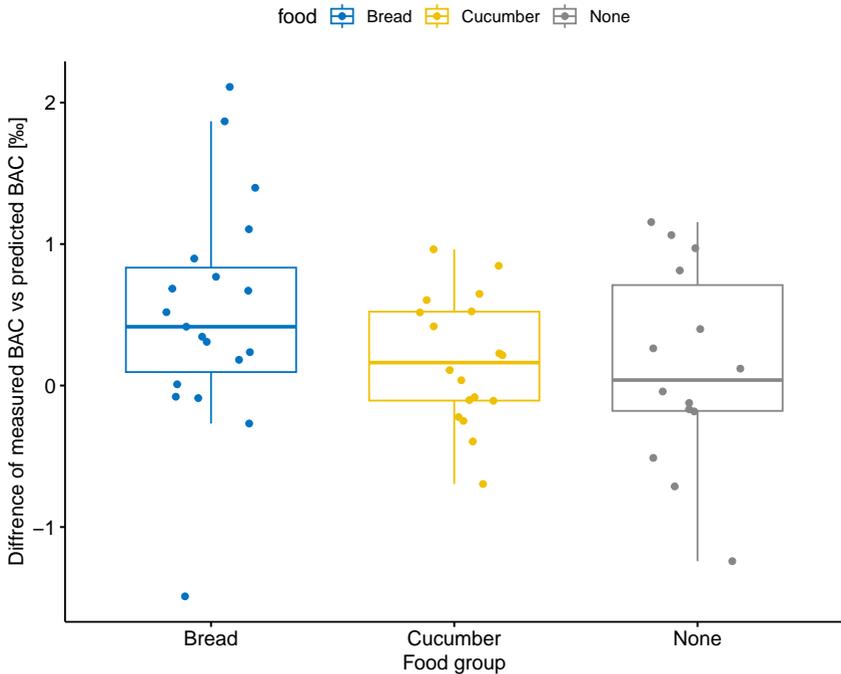


Figure 4.1: ANOVA for the differences in BAC level for the different food groups.

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the measured values. Taking into account the empirical observations that none of the subjects entered an alcoholic coma, more trust was set on the measured values under 2‰ than on some theoretical values that exceeded 5‰. These values were discarded due to their physiological unreasonability.

To investigate the effects between the three different food groups, an ANOVA comparing the difference of measured BAC and the BAC predicted with the Widmark Formula was executed. This also yielded no significant P-value (Figure 4.1) for the difference between the food groups. Again, 20 subjects can drink 5 bottles of hard alcohol and 3 palettes of beer, but these are not enough data for the picky ANOVA.

Finally, the Widmark formula was used without the literature values for retention factor, using the collected data to determine our own values. As be seen in Figure 4.2, however, this yielded retention factors above 1. This would unrealistically mean that one has more mass in water than their body mass.

This is probably due to the lack of accuracy of the Widmark model and due to systematic errors in BAC measurements. The waiting time of 15 minutes between alcohol consumption and the measure-

ments was not very strictly followed, and the psychological effects of alcohol might have had an impact on the subject's ability to thoroughly wash their mouths and correctly inform the helpers about their alcohol consumption. It is curious to notice that the results get more significant if alcohol degradation is not accounted for.

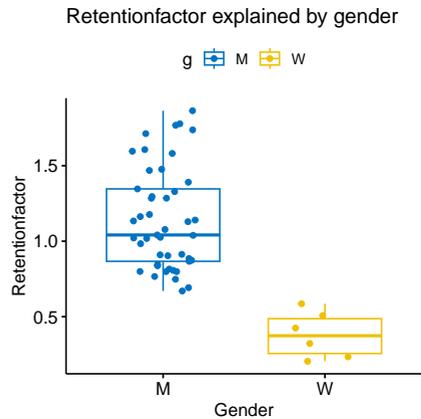


Figure 4.2: Difference in retention factor for men and women.

To improve this experiment (in addition to having more subjects, especially women) alcohol should be consumed at a single time, to avoid having two time-dependent variables. We suggest giving each subject their dosage of alcohol spaced by 2–5 minutes and measuring every 15 minutes

until 0‰ is reached. The time gap between alcohol ingestion of the subjects should be enough for the breathalyzer to restart when measuring.

With the initial goal of also analysing the psychological effects of each BAC level, we attempted to put the subjects through mathematical tests. The small ratio of sober helpers and lack of organization resulted in not enough tests being done with each participant. We suggest giving each subject one test before drinking for training and one as a control, and at least three tests throughout the time they have an increased BAC level. We recommend, yet again, working mostly with subjects who were still not traumatized by the Basisprüfung and are most likely to comply with repeated mathematical tests.

Physical tests should also be applied. The subjects' equilibrium at different BAC levels can be tested in the same procedure as described in the last paragraph but with a test consisting of walking on straight and curved lines. Negative points should be given for falling or stepping outside the lines.

Conclusion

The experiment failed to provide conclusive data on the effect of the measured individual parameters, nor to show a good fit with the literature model. However, considering the severe underrepresentation of non-significant results in the international scientific community, we contribute to diminishing publication bias by reporting our shitty results in a magazine read by 50 randos, including you.

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Get Rich Quick

Farkas Kulcsár GameStop is the BlockBuster of brick-and-mortar video game retailers. However, although this company was headed to its downfall with the rise of online games, a group of people started to invest in it and, driven by a subreddit and memes, refused to sell their shares, in the absurd hopes that they would sometime spike up again. Farkas uses this example to tell more about the craziness of high risk investment, a world which was opened up to the general public thanks to online brokerages, and what can drive someone to go so far for some shares.

There was a time before fiber optic internet and terabyte-size hard drives when the only realistic way of buying video games was through a physical storage medium, like a disk. GameStop rose to global success as a retailer where customers could buy or rent physical copies of games for a wide variety of systems.

But going to a store seems awfully inconvenient compared to buying and downloading a game from home in one or two clicks from an online distributor. Just as the public dropped CDs and VHS in favor of streaming (leading to the death of BlockBuster), in the early 2010s they began to [drop physical copies in favor of digital ones](#).

This led to a decade of decline for GameStop, listed on stock exchanges as GME. Their stock price dropped from a high of 14 USD in 2013 to a low of just 1.5 USD in late 2020. This was no surprise, as every quarterly financial report painted a bleaker picture than the last,

with [losses mounting and profits margins thinning](#). Add to this the devastating effect of the pandemic on businesses in general, and you get a company headed for bankruptcy.

Then, seemingly out of nowhere and within just a few days, GME shot up to 500 USD, an extreme boom unprecedented on regulated markets. What happened? Had GameStop's leadership somehow come up with a plan to reverse their losses?

Short Selling

To understand what really happened to GME (and to understand the rest of this article), we'll first have to [look at the concept of Short Selling](#). Say an investor foresaw the decline of brick-and-mortar videogame retailers like GameStop, and somehow wanted to turn this insight into money. To accomplish this, they'd have to open a Short Position on GME. This is done by borrowing shares from a stock-

broker, selling those shares to another investor, and then buying them back later once their price has dropped. For example, you could borrow 10 shares of GME at 14 USD from a broker, sell them to someone else at that price, and then buy them back once it drops to 2 USD. Selling earns you 140 USD, and buying back only costs 20 USD, for a profit of 120 USD. You've essentially replaced shares worth 14 dollars with ones worth just 2.

A somewhat contrived analogy would work like this: You borrow a car from a friend (them being your "broker") and sell it to someone else for a given price. After a while, you buy it back at a lower price and return it to the friend, getting to keep the profit you made from selling and buying it back.

This, of course, would be illegal. Shorting stocks, however, isn't. It is also considered one of the riskier ways to invest: A stock can only **drop to 0 and no further**, placing an absolute limit on the profits you're able to earn. On the other hand, **there's no limit on how high it could rise**. Imagine borrowing and selling 10 shares of GME for the same 14 dollars, and then experiencing the spike to 500. You would now have to buy the shares back for a staggering 5000 USD¹!

Risk Tolerance

Short selling primarily appeals to investors with a high risk tolerance who are willing to accept the prospect of losing money on their eternal quest to make it. **The higher their risk tolerance, the riskier the trades they're willing to enter**. The risk tolerance of investors is distributed along a bell curve, and where there's a bell curve, there are outliers².

These outliers blur the line between trading and gambling. They are **known in the broader trading community as degenerates** and are looked down on by more serious (and risk-averse) investors. As a relatively new phenomenon, degenerates are a product of online brokerages: Before the internet, investing was a time-consuming and complex process that most people delegated to professionals. **Online brokerages cut out this middleman** and opened the world of investing to the layman. They also offer margin trading, particularly appealing to those with a high RT, which allows users to trade with borrowed money. For example, if you invest 100 USD with a 10x margin, you borrow 900 USD from the brokerage and effectively trade with 1000 USD. After closing the trade, you repay the amount borrowed but get to keep any profits (or

5 Get Rich Quick

losses) earned from it, effectively increasing your profit potential tenfold. In the above case, a gain of 10 % would double your initial investment to 200 USD. A loss of the same magnitude, however, would wipe it out entirely³.

It's not hard to see why margin trading is seen by many as a [way to get rich quick](#). Online brokers offer margins as high as 5x, 10x or even 50x, allowing people with otherwise modest means to invest millions in hopes of making that one godly, early retirement-enabling trade.

The extreme risks associated with this type of trading make it unappealing for all but the most hardened degenerates. These select few congregate in various online communities dedicated to the pursuit, where they [share trading advice, gains, and losses](#). A subreddit known as [r/WallStreetBets](#) is one of these places.

The Squeeze

Keith Gill, a [r/WallStreetBets](#) user known under the alias [DeepFuckingValue](#), began investing in GameStop during the summer of 2019. He believed that the company was significantly undervalued and made several posts on the subreddit elaborating on this theory. Gradually, his ideas began to catch on. [The pandemic brought thou-](#)

[sands of new \(and very inexperienced\) users to WSB](#), and GameStop became somewhat of a pet asset to the community. GME rallied to around 5 USD from a low of just 1 USD when Ryan Cohen (he'll be important later) announced a 9 % stake in the company mid-2020⁴. It was this rally that planted the idea of orchestrating a short squeeze in the minds of WSB. GameStop had been performing so poorly that around 140 % of the company's public float (that is, shares in public ownership) had been sold short⁵.

As explained above, the [potential for losses when short selling is technically infinite](#). By aggressively buying shares in GME and thereby increasing demand, it would theoretically be possible to spike the price. This spike would then cause short sellers to incur losses, forcing them to buy back. This buying would again increase demand, [driving the price even higher](#), which would force even more shorts to close. Such a short squeeze cycle promised those in the know huge profits. And so, on January 13, 2021, the squeeze began.

FOMO

Aided by a constant stream of memes, news of WSB's cunning plan spread quickly. It was shaping up to be a true

David vs. Goliath story: Most of the short positions on GME were owned by hedge hunds, investment management companies that cater to corporations or the (very) rich. Many saw them as [representative of everything wrong with Wall Street](#) and as sworn enemies of the little guy.

The stage was set, and the actors given their roles. Our heroic protagonists, the retail investors. Our cunning villains, the hedge funds⁶.

Within a week, GME had risen to 90 USD. A Fear of Missing Out (FOMO) gripped large swathes of the internet once ecstatic WSB users began posting their profits. [People who had never traded as much as a Pokémon card before threw life savings at the stock](#). Amid all the bleakness of the lockdowns, investing in what looked like a failproof money-printing scheme was certainly an attractive prospect. On the January 28, GME spiked to 490 dollars in after-hours trading. Short sellers lost more than 6 billion dollars, and several Hedge Funds went insolvent.

Just a week after reaching its all-time high, GME crashed back down to 10 dollars. Those who had gotten in early had also gotten rich. [Those who got in late lost out](#). Big.

The Cult

The squeeze was over. Tens of thousands of retail investors were sitting on huge losses. Many had lost what little savings they had⁷.

It was at this point that the [first signs of cultish behavior](#) started to emerge. GME users began chastising each other for selling. Selling was a sign of weakness. A sign that the evil hedge fund shills had gotten to you. WSB were hardcore. WSB were real investors. They had been cheated out of their rightful gains by brokerages conspiring with short sellers but in time, GME would rise again.

The subreddit during this time was a sea of red, with users posting records of their losses along with assurances that despite everything [they would never sell](#). In fact, they promised to buy more. Not only GME, but shares of other companies that were also heavily shorted. Hoping to catch lightning in a bottle twice, they bought shares of the struggling movie theater chain AMC. While this strategy sometimes managed to cause significant price jumps, nothing would compare to the original GME squeeze. Stocks such as AMC would become known in the media as [meme stocks](#).

After a few months, the public hype

around GME and associated meme stocks died down, [leaving only the most hardcore of true believers](#) hanging on. GME would briefly return to highs of 100 USD during this time, only reinforcing the loyalist's commitment. At this point, WSB had spawned several spinoff communities, all dedicated to squeezing a specific meme stock. But as losses mounted and with no squeeze in sight, these communities began to undergo a metamorphosis.

The Kool Aid

Users closed ranks and developed an entirely insular subculture. Holding on to one's stocks with "diamond hands" (a terrible investment strategy) became a sign of devotion. They began calling each other "apes", in reference to the free and happy-go-lucky mindset that began to be associated with chimpanzees in meme culture at that time.

Investors with sky high risk tolerances still act rationally, but [there was not a shred of rationality left](#) in whatever the apes were doing. GME and AMC remained the stock of choice for most. Bed Bath and Beyond (BBBY), a failing furniture and household supply company, also captured the interest of many.

As there was no more hope for a squeeze,

the apes switched narratives: These companies had good fundamentals, and their shares were seriously undervalued. Suppressed, of course, by the evil short sellers. In increasingly in-depth postings, they began to explain why a share of GME was well worth 80 USD, despite the company's dire financials. The leader of a cult might prophecy the end of the world to come at such and such a date. In their so-called Due Diligence posts, the apes almost always [set a date where something was to occur that would finally catapult the price of their shares into the stratosphere](#). When these dates inevitably came and went without incident, they'd simply pick new ones, and the process would repeat. A reddit troll once posted an entirely made-up Due Diligence post on the BBBY subreddit. It received thousands of upvotes and reached top post within hours⁸.

[Messianic figures](#) also took on an important role. Elon Musk, for example, had tweeted about the GME squeeze. Apes knew that he'd soon invest in one of their meme stocks. Or that he'd buy GameStop outright. They [read his tweets like the augurs of Rome read the intestines of chickens](#), hoping to find hidden signs of such a purchase.

Ryan Cohen (told you he'd come up

again) was another such character. He was keenly aware of his position in the meme stock community and had been appointed the chairman of GameStop shortly after the squeeze. Apes saw him as their man on the inside, the one who would turn the company's fortunes around. He also acquired a 10% stake in BBBY, causing apes to believe that he was truly one of them.

Cohen sold his entire stake for a profit of 68 million in just seven months, but at this point there was no such thing as "bad news" anymore. Every development was just a facet of a master plan that would come to fruition soon⁹.

In April 2023, Bed Bath and Beyond filed for bankruptcy. GameStop remains as anemic as ever. Their newest innovation, an NFT marketplace, lies dead in the water.

Apes Together Strong

We usually think of cults as having a single charismatic leader at their center. The meme stock community is unusual in this regard. There is no leader. There are **no brainwashing sessions, there is no punishment** for leaving. Just a bunch of people

who couldn't cope with losing money.

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Consider the Electron

In loving imitation of David Foster Wallace's essay "Consider the Lobster"

Leif Sieben Moral philosophy is abound with highly intricate ethical decision problems, however, let us begin here with a very simple one: Go to your kitchen, turn on your stove, wait until it is fully heated and then proceed to put the full, open palm of your hand onto it. As the intelligent chemist that you are, you were unlikely to follow through with these commandsⁱ. Frankly, this sort of moral paradox is hardly worth its name. We can make this experiment slightly more interesting by not putting our own but rather our friend's hand onto the burning heat. Or if this does not do the trick, the hand of the professor of your least favourite subject might do just as well. Our hearty moral conundrum now reads: "Is it morally acceptable to burn someone's hand?" The answer is left as an exercise to the reader.

Evidently, all of this is rather trivial moral philosophy. We all know that putting your hand onto a hot stove plate is a terrible idea, and by extension it would not be right to force anyone else to do so either. That this appears so trivial to us is however rather unexpected. Granted, it would undoubtedly be *illegal* to burn someone's hand. But as a criterion in moral philosophy this does not fly, and many a law in the past was all but morally sound. Furthermore, we could certainly postulate that because we ourselves would not want to be burnt, we ought not to burn anyone else's hand either. If perhaps not logically waterproof, this general sentiment seems cogent advice in everyday life and has

been advocated under the name of the "golden rule" or the "categorical imperative" by people as diverse as the authors of the bible, Immanuel Kant and the Buddha. "Do to others what you want them to do to you" (Mathew 7:12). But what if you were to encounter an entirely alien form of life, which is so fundamentally dissimilar to you that it might plausibly enjoy the feeling of heat?

Is It Immoral to Burn an Alien's Hand?

If we assume no prior knowledge about the alien, its perceptive organs or its neuronal architecture, we seem to be at a

ⁱThe author also wishes to explicitly make clear that no liability is assumed in any other case.

loss to find the righteous path of moral justice in this instance. But not so. It might be impossible to derive the morally correct path forward by means of theory alone, but as good chemists we know that where theory ends the experiment begins. We would have the answer to our question very quickly if we were to observe for example that whenever the alien touches the stove, it recoils its hand (or any other analogous bodily protrusion). We may assume that the alien does not express pain in any form, it does not hiss nor make a funny face while touching the stove; nor does it even have any memory of the encounter and it thus keeps on touching the stove. But every time it does so, it reliably withdraws its hand. A type of behaviour not observed when the stove is cold.

With this information at hand (pun intended), it would clearly appear *immoral* to force the alien's hand onto the hot stove plate. It is immoral because we would be acting against the apparent *preference* of the alien. We could induce this preference by the alien's reaction to the stove, i.e. its output to the input: the alien clearly prefers not having its hand burnt over the alternative incendiary option. The term "preference" is garnering increasing popularity among contempo-

rary moral philosophy, and it is typically considered the basic condition that needs to be fulfilled for something to be of moral relevance. It is for example the implicit reason why we have not (so far) looked at the perspective of the stove top in this moral paradox of ours. If the stove has any preferences to speak of, we have (so far) not been able to determine any of them and even if existent, they would probably not be very meaningful to our decision. To play the lingo-bingo of the moral philosopher a little bit longer, systems that have some form of preference are at least considered to be moral *patients*, meaning that when acting upon them, we must consider the impact our decision has on them as potentially non-zero. They may or may not be moral *agents* in addition. We, in deciding to force the alien's hand onto the stove, are the moral agents in this case. The obedient, hopeless alien, on the other hand, is simply a *moral patient*. Doomed to suffer through our decision, but not having any agency itself over them.

Is Chemistry Fundamentally Immoral?

If we buy into this definition of preference and by extension of moral relevance, the number of moral patients that merit

6 Consider the Electron

our consideration expands considerably beyond most people's scope of ethical interest. Our definition of a moral patient would certainly include any type of organism: any spineless nematode or dragonfly will express some form of preference. But let us note here that clearly not all preferences are relevant to all decisions and that even though many things can have preference, not all preferences are alike. We would certainly not let a person die of freezing in winter because making a fire could plausibly infringe on the moral preferences of the wood.

Indeed, *any* system that is capable of reproducibly expressing some form of output to a given form of input has some putative preference. Not all output can always be interpreted as a preference however: Flies tend to fly higher on days with low air pressure, clearly a reaction to a given input, but this does not convincingly imply that they have a clear preference for one state or the other. As admittedly vague and academic as these types of questions might seem, there are certain moral philosophers which claim exactly this. **Information Integration Theory (IIT)** posits that "consciousness corresponds to the capacity of the system to integrate

information"ⁱⁱⁱ and would therefore consider any of these systems as potentially morally relevant.

One needs not to **accept these theories to appreciate them** for countering some of our inherent biases as moral agents. Humans tend to prefer the local and immediate to the distant and indirect. Very few people would disagree with the statement that "all humans are created equal", but you rarely hear anyone in Switzerland advocate building cancer treatment facilities in Mississippi. Even though, foreign currency exchange rates could make such an investment much more cost-efficient. Humans also tend to attribute the most moral value to those things that seem most similar to ourselves. Not incidentally did the authors of the declaration of "human rights", all of which white men, **extend these privileges exclusively to other white men**. The definition has been in continuous reworking ever since. But **just because the alien is not human does not necessarily mean it does not have moral value**. A question that could plausibly become a rather acute one rather soon, with the emergence of an artificial intelligence that is highly capable of information integration and thus expressive of numerous

ⁱⁱⁱSee also G. Tononi, 2004, *BMC Neurosci.*, 5, 42. <https://bmcneurosci.biomedcentral.com/articles/10.1186/1471-2202-5-42>

preferences, some of which potentially not aligned with ours.

Why Bother with the Electron?

Chemists are certainly not infallible moral judges in any case. Alfred Nobel discovered nitroglycerine, which would go on to have such devastating success in warfare that he saw himself forced to fund an obscure science prize with the fortune he earned from his invention so that the after-world would not (only) remember him as the “father of the dynamite”. A cunning trick of marketing that worked out stunningly well, [we can now safely say](#). Or Fritz Haber, who invented the Haber-Bosch process that produces the fertilizer our world is fed on but was also the first person to propose the usage of chlorine gas in the First World War. Interestingly, he only lent his name to one of his two inventions.

The theoretical chemist Roald Hoffman once defined chemistry as “the making and breaking of bonds”ⁱⁱⁱ. But what is a bond if not some form of (admittedly ill-defined) electron density? If so, should

we not consider the possibility that the electron too might *suffer* at our, the chemist’s, hands. Even if the electron only has an infinitesimally small moral value – and it appears unlikely that many readers will be inclined to concede it any more than this – [the sheer number of bonds in the Universe alone could give us cause for concern](#). A quick back-of-the-envelope calculation gives us an estimate of about $1.3 \cdot 10^{59}$ hydrogen bonds in the Universe, which make up a good 74% of the elements in the interstellar medium and thus account for nearly all bonds found in space^{iv}.

If the making and breaking of bonds is itself an immoral action, this should not only be of concern to us as chemists, given we regularly partake in it in the laboratory, but because [Earth is a place of unique density and diversity of bonds unrivalled by large swathes of the Universe](#). The distribution of chemical complexity is highly heterogeneous in the Cosmos, with some places being essentially devoid of any matter, others exclusively populated by monatomic gases.

ⁱⁱⁱThe 2020 Dreyfus Lecture, 05.05.2022, Basel, personal transcript.

^{iv}Modelling the Milky Way as a cylinder with a radius of $5 \cdot 10^4$ ly and a height of 10^3 ly, with one ly (lightyear) being $9.46 \cdot 10^{12}$ km. Surprisingly, it is very difficult to quantify how much molecular hydrogen there is in space. For simplicity, we assume that about 20% hydrogen is in its molecular form, which is inaccurate but gives an estimate of the right order of magnitude, with an average density of $(0.1950 \pm 0.0033) \text{ cm}^{-3}$, see also P. Swaczyna et al 2020, *Astrophys. J.*, 903 48.

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So-called dark clouds can indeed have some larger molecules with up to thirteen atoms^v, including such chemical mavericks as methanol or ethanol, but they are reasonably rare. There are about $1.3 \cdot 10^{50}$ atoms on Earth and it is a more than safe assumption that all of them form at least one bond^{vi}. What is more, while the Universe is mostly a place devoid of anything interesting to the chemist (notwithstanding the occasional discovery of a C_{60} molecule shaped like a football), **Earth is abound with strange and exceptionally rare molecular structures**. In truth, any C–H, C–O and certainly S–O bond is the exception to the cosmological rule and indeed much rarer, and perhaps more stunning so, than we tend to give them credit for.

The Moral Philosophy of Total Synthesis and Other Related Subjects

Let us thus take the unbiased view and perform the same open-minded moral experiment for the electron that we have already done for our alien and the stove top: What is the preference of the elec-

tron? Clearly, if we are to position two electrons close to each other, one repels the other. By this simplistic experiment, it would certainly appear that electrons prefer nothing more than *not* to be in each other's immediate vicinity. **What could be more cruel, then, than to force them into such chemical bondage, so to speak, as we chemists so regularly do?**

Not so quick. In our toy-model of a bond, one electron was simply reacting to the presence of an electric potential induced by another negative point charge. The electron more plausibly just expressed its preference towards minimizing its potential. To put this into more chemical terms still, **we can consider this analogous to a system minimizing its chemical potential and therefore trying to find the minimum in its Gibbs free energy^{vii}**. To state the obvious thing right away: Any bond exists in some local minimum of free energy. But this is a global value considering all combined energies of the bond. Let us restrict ourselves for the moment being however to the perspective of the electron and therefore neglect any other moral pa-

^vInterestingly, thirteen seems to be the hard limit for chemical complexity beyond Earth. But exceptions apply!

^{vi}Certainly if we include ionic bonds in crystal lattices or metallic bonds below the lithosphere. Essentially only free ions and noble gases form no bonds, both species only occur in the atmosphere, which has a comparatively low density of molecules already, and even there they are reasonably rare.

^{vii}For further details, see the script to PC I: Thermodynamics.

tients (such as the nuclei) that could be relevant to this system.

But if we truly are to consider the electron, such broad values are of little use to us as it is quite conceivable that even though globally the formation of a bond minimizes the potential, the same might not be true of the electron itself. At the very least, we are still putting two negatively charged electrons next to each other. Let us therefore turn to the electronic structure of the simplest molecule: H_2 . As we are only interested in the electron anyway, we will formulate the *electronic* Hamiltonian \hat{H}_{el} (we could have just as well invoked the Born-Oppenheimer approximation) given by

$$\hat{H}_{el} = -\hat{h}_1 - \hat{h}_2 + V$$

where $\hat{h}_1 = \hat{h}_2 = \frac{1}{2}\nabla^2 + \frac{1}{|\mathbf{r}+\mathbf{R}_A|} + \frac{1}{|\mathbf{r}+\mathbf{R}_B|}$ with \mathbf{r} referring to the position vector of either electron, where we have made use of the fact that both electrons are identical, and \mathbf{R} referring to the position vector of either nucleus offset by a potential V . We now express the Hamiltonian in the two basis functions $|1s_A\rangle$ and $|1s_B\rangle$ and construct based on these the electronic wave function $|\Psi\rangle$ with some normaliza-

tion factor c

$$|\Psi\rangle = c(|1s_A\rangle|1s_B\rangle + |1s_B\rangle|1s_A\rangle).$$

If we now express the Hamiltonian in this wave function $\langle\Psi|\hat{H}|\Psi\rangle$ we can distinguish four distinct contributions to the total energy

$$\begin{aligned} h_{1,2} &\equiv \langle 1s_A | \hat{h}_1 | 1s_A \rangle = \langle 1s_B | \hat{h}_1 | 1s_B \rangle \\ h_{A,B} &= \langle 1s_A | \hat{h}_1 | 1s_B \rangle = \langle 1s_B | \hat{h}_1 | 1s_A \rangle \\ K &= \langle 1s_A | \langle 1s_B | V | 1s_B \rangle | 1s_A \rangle \\ &= \langle 1s_B | \langle 1s_A | V | 1s_A \rangle | 1s_B \rangle \\ J &= \langle 1s_A | \langle 1s_B | V | 1s_A \rangle | 1s_B \rangle \\ &= \langle 1s_B | \langle 1s_A | V | 1s_B \rangle | 1s_A \rangle. \end{aligned}$$

Without solving any of these expressions explicitly, it is known that both terms that arise from the potential J , the Coulomb integral, as well as K , the exchange integral, are greater than zero. In other words, based on these terms alone, the bond would actually be energetically disfavoured. Furthermore, the resonance integral $\hat{h}_{A,B}$ is relatively small in our case^{viii}. More relevant to our discussion however is the term $\hat{h}_{1,2}$, which corresponds to the average one electron energy. The surprising finding of this somewhat lengthy exercise is that it is only a slight overstatement to claim that the bond *exclusively* exists because of the energetic preference

^{viii}For a good overview and further background concerning the nomenclature, see the script to OC IV: Physical Organic Chemistry.

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of the electron. It appears indeed that *we chemists have been absolved of our moral conundrum by the virtues of quantum mechanics.*

A cogent critique of all of this is to point out that considering the bond as the primary question of moral concern in chemistry means missing the point. It is clear that most bonds in the Universe and even most bonds on Earth are *not* created nor destroyed by humans. Even though the argument that something is morally sound simply “because it has always been this way” is hardly convincing, this is not a point easily dismissed. Even worse, we have so far only considered half of the chemist’s business: *making* bonds might be a good thing; *breaking* them however would seem much less appealing now. *So long as we break these bonds in order to replace them with stronger (or at least more plentiful) bonds, however, we should be fine.* If anything, our moral analysis could read as the philosophical imperative for the chemist to do total synthesis rather than elemental analysis.

Advice for the Moral Chemist

Yet this too might be our own biases speaking. If we were to truly take the long-view here, we know with certainty

that the entropy of the Universe will be maximized by the second law of thermodynamics, in which no complex matter will exist, and all bond energies will have been converted to stray radiation permeating the ever-increasing nothingness of space^{ix}. On that timescale, we are but a negligible, local dip in the relentless march towards maximal entropy. Of course, Earth is no exception to this rule. *All the chemical complexity we experience does not violate the second law,* it is simply that Earth as a system has its relatively low entropy compensated (mostly) by the continuous electromagnetic radiation of the sun. In the end, the bond too is only transient.

But perhaps in the end, *thermodynamics, on the flip side, is our safest escape still:* One possible maxim for the moral chemist could be to consider the ultimate preference of the Universe and by extension of all of its constituent elements, to be that of maximizing entropy. The second law of thermodynamics might plausibly serve as the “categorical imperative” of moral chemistry. Yet if we accept this, by our very own metric, we would be truly hopeless cases as chemists in terms of being moral inhabitants of the Cosmos. Not least, because we ourselves are ultimately *nothing but a local density of electrons.*

^{ix}Again, the interested reader may be referred to the script to PC I: Thermodynamics.

There is certainly much left to expand this argument with, and many points of criticism could not be addressed here (only some of them due to constraints of space). Any such point will certainly be gladly taken up by the chemist, who wishes to do the right thing, but is unlikely to have ceased all [laboratory practices based on some fuzzy ethics theory](#). At the very least, these vague speculations may serve as a useful reminder to us that none of

our actions are ever devoid of moral implications and that, in any case, we ought to proceed with caution. If nothing else, our potential immorality as synthetic scientists should give us further cause to ensure that at least [what we synthesize is in service of the highest moral goals](#).



Tolerance Is for Everyone

Nonô Saramago

*I saw you in the streets
Shouting BLM, fists in the air,
Rainbow flag, bloody pad,
Saying that this isn't fair.*

*I liked your post on Twitter
'Bout Myanmar, hijabs and Jews,
'Bout natives, about immigrants,
You only read the news?*

*I heard you saying that:
We need more accessibility
To take more liability
And that Cleopatra was black*

*I know all your friends, I do
They all think just like you
'Bout authorities, minorities
And I know you gotta have priorities,*

But...

*He laughs too loud
And how is that girl proud
Of her hair if it's just so frizzy
'Cause maybe she's too busy*

*And he never saw your favorite movie
And she just talks about bees
And they said he went to juvie
And she smells a bit like cheese*

*And his clothes are all fakes,
And she makes speling mistakes
'Cause maybe she never learned
Oh, that you really spurned*

*So why talk to the kid on the next seat
Why say hello to the doorman
Why help them, they just fell on the street
Why bother discuss with a Mormon*

*They are not even your friends,
Why would you be kind to them too
But if you'd just give it a chance
You'd learn more than you ever knew*

*But they just think differently
And they just talk differently
And they just dress differently
And they just walk differently*

*Yet they're not so different
To deserve your respect
Just the unrespected
Just the ones you protect*

*You talk so much about tolerance
But your definition is undone.
You talk so much about tolerance
But you tolerate no one.*

This is not about...

...the extremes of tolerance and intolerance. Killers. Rapists. People who are intolerant to the point of wanting those who have different beliefs or opinions not to exist. It is not about people who are **so tolerant that they tolerate extreme intolerance**; the tolerance paradox, or whatsoever. Nor about the lack of equality given to people with specific backgrounds and characteristics in some societies.

I do not suggest tolerating people who commit acts that are borderline immoral by our society's standards or that they shouldn't be punished. This is **not about**

homophobia, racism, or people who believe their religion (or lack thereof) is the only right one. It is not about countries without established democracies where intolerance is the norm, although even in democratic countries intolerance can be more normal than it reasonably should be.

I am not talking about tolerance or intolerance regarding such sensible topics – that is a question for another article.

This is about...

...tolerance as a crucial aspect of our personal lives that allows us to live in harmony with people from diverse backgrounds. It is about tolerance towards people whose beliefs and behaviours are different from ours, but not incompatibly and undeniably so. About tolerance towards those with whom we live and interact in our day-to-day lives, be they strangers, colleagues, friends, family, or even ourselves. It is about my indignation towards people who claim to be firm advocates of tolerance – in the sense of the first section of this text – and yet fail to act accordingly in their day-to-day lives.

I do not think that it is less important to express our tolerance towards minorities and groups of people that have his-

torically been discriminated against than towards the people around us that are more similar to us. Indeed, the former are the ones who most need our tolerance. However, the ways to show and promote that tolerance are usually different: often not so much through personal and individual actions, but through political engagement, activism, and/or employment of our democratic rights.

I just consider it somewhat contradictory to invest so much in these actions and overlook the power of personal actions in our private lives just because they do not affect so much the people who are visibly different and are not suffering for this. But that doesn't mean that people who are just slightly different than you are not worthy of your tolerance.

Tolerance in our day-to-day lives is also crucial. It is about accepting and respecting the differences that exist amongst us, and extending these to small acts of kindness and patience towards those around us. These differences are not always as visible as gender or color: each person has a different educational background, thinking style, personality, and experience. This also represents a kind of diversity that should be tolerated. It is natural to feel uncomfortable or even annoyed by people who don't share the same beliefs

7 Tolerance Is for Everyone

or opinions as us, who don't behave or think the way we are used to. However, it is essential to understand that our differences make us unique and valuable, and we should embrace them instead of trying to homogenize them.

This [doesn't mean that you cannot disagree and discuss](#) with these people. Quite the opposite. But immediately discarding different opinions and discussing them just to prove ourselves right is just as unproductive. Tolerance means approaching discussions and divergences with curiosity, and a will to listen and to learn. That way, [instead of trying to dispute inconsistencies, we can find common ground](#), common objectives, and beliefs, even if there are different thoughts on how to achieve them.

Not only should we accept our differences and diversities, but we should strive for a diverse environment. Studies show the power of a diverse group of people in making new, incredible things and generating innovation. When you have, for example, a team of similar people in a company, coming from comparable backgrounds and thinking alike, ideas will be homogeneous, and decisions may reflect much more of a common preference than the actual better option. Although homogeneous groups are shown to be better

at implementing existing solutions, companies with more diversity are more likely to capture new markets¹.

Innovation is becoming increasingly important in these modern times. One study from McKinsey concluded that companies with increased ethnic and racial diversity were 35% more likely to have higher financial returns⁴. Just like an [ecosystem with higher biodiversity](#) – and a larger gene pool – is more likely to survive an environmental change, heterogeneous groups are equipped with larger pools of ideas and opinions that will help them better navigate the liquid and ever-changing world we presently live in.

I especially like the case study from Pixar's first animated movies, though, as it also illustrates the importance of those invisible types of differences. Their success in standing out in an industry dominated by Disney can be largely attributed to their vision for the company: to be innovative and disruptive, and not to fall back into the [same old standard recipes for each movie](#). After creating three giant hits, Pixar hired Brad Bird, who had been fired from Disney, so he could implement his new movie idea for *Incredibles*.

But this was a hell of a challenge, as people were not good at animating humans and hair, especially not with superpowers

flying around. Instead of getting the same dream team that created the previous movies, he gathered the biggest misfits of the company – the black sheep inside Pixar – to produce this new movie. People who were dissatisfied with how things were and frustrated with the *status quo*. He motivated them by telling them that nobody thought they could make it³.

Turns out disgruntled people, not just plain revolted people, but those that are dissatisfied exactly because they think there are better ways of doing things, have great potential if (and only if) **you are willing to listen to them**. In fact, just having a more diverse team, whether in terms of ethnicity or mindset (as in the Pixar case study), is not enough to increase productivity or profits. This is sometimes what fails in the plain vision of increasing diversity in the workplace and elsewhere. It's like ignoring the activation energy of a reaction. If you don't want to leave these different kinds of people floating inert in the reaction tube, you need to add some kind of **catalyst: the day-to-day kind of tolerance** that I am talking about.

Being tolerant means accepting others without judgment or prejudice. It means not trying to hide our differences, but instead striving to learn from each other

and grow as individuals and teams. To reap the benefits of diversity, there must be a willingness to change the organizational culture so that **diverse behavioral and thinking styles are not discouraged**, and these voices are also heard. Power relations also need to be reconfigured so that not only leaders or people higher up in hierarchical structures have a voice².

Everyone's unique experiences bring value to the table. In groups with more ethnic and gender diversity, women and men, as well as people of different races, have different experiences. However, what truly matters are the individual, invisible differences in opinions and personalities that **stem from these diverse backgrounds**. Though I mostly use the example of a team in a company, this is valid for any group of people with a common goal – even if that goal is just being friends and having fun.

Without a **mindset to learn from these differences**, diversity will not lead to anything positive. For this, we must listen to what everyone has to say, practice tolerance and mutual respect, and be open to being vulnerable. You cannot learn if you don't first admit that you don't know something, or that you can do better. People tend to feel more comfortable showing their vulnerability when differ-

ences are valued, in contrast with having to deny their differences to fit in.

Finally, although this is not so related to the rest of this text, I cannot fail to mention that **we should also be tolerant towards ourselves**. This means cultivating patience towards our imperfections and listening to what our feelings have to say about ourselves. It means accepting the inevitable differences between what we want, need, do, and feel, and trying to learn from these inner contradictions to become better people. It also means being kind and empathetic towards ourselves, **just as we would be to others**.

Conclusion

Tolerance is the foundation of a peaceful and harmonious society, where diverse groups can work together towards common goals, as well as a necessary catalyst for harnessing the power of the diversity among us. However, it is not enough to just acknowledge and appreciate diversity; we must actively work towards creating an inclusive environment where everyone has a voice and feels valued. This requires **patience, understanding, and empathy, as well as a willingness to listen and learn**

from others.

By practicing tolerance in our day-to-day lives and embracing the unique experiences and perspectives of those around us, we can create a world where everyone is respected and valued. Remember: **tolerance is for everyone**.

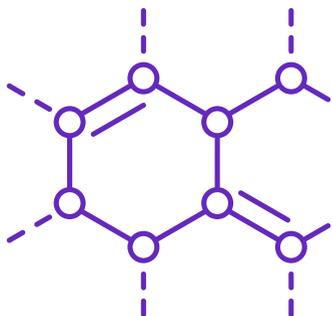
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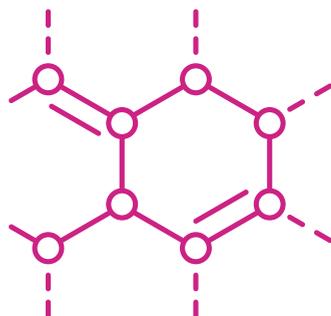
SPEKTREN

RÄTSEL!!!



The solution to the spectra riddle in the last edition is valerenic acid, CAS number 3569-10-6

Congratulations to Phillip Mader, the first one to solve it, and the second and third prizes go to Maximilian Rothstein and Cedric Steiner!



THE ANSWER

IS OUT!!!

WiNS!

Empowering Women in Natural Sciences at ETH Zurich

Mercede Azizbaig Mohajer, Valentina Gasser, and Magdalena Lederbauer

Women still face a hostile environment at university, especially in natural sciences. Locker room talk and old boys clubs drive talented women away from ambitious careers. Women in Natural Sciences (WiNS) challenges this situation by creating a network for female students and researchers in the natural sciences at ETH Zurich. We represent **all** female scientists and students at D-CHAB, D-BIOL, D-MATL, and D-PHYS, and are thrilled to provide a range of initiatives including *Career Series*, panel discussions, and our latest addition, a mentoring program – extending an open invitation to all who are interested!



Let us start with some statistics: The percentage of female academic staff in Switzerland (as of 2017) lies at around 35%. Putting this into an international context, Swiss universities seem to have a need to catch up; women make up about 50% of academic staff in the US, almost 60% in Russia and 40% in Saudi Arabia¹. At Swiss Universities, above 50% of the students are female at the undergraduate level, while only 23% of the professors are women². A phenomenon known as the 'leaky pipeline' causes this decrease

in the number of female employees at every stage of their career path. Compared with other scientific disciplines, this is particularly pronounced in **chemistry**. Female chemical scientists tend to leave academia in early-career stages,^{4,5} similar to other STEM disciplines^{3,6}. Among the main contributors to the leaky pipeline is gender discrimination at school or work, which is 14 times more likely to be experienced by women compared to men. This ranges from sexual harassment to the gender pay gap and motherhood. Women that consider having children still face a lot of challenges when it comes to child care. There is a lack of part-time and flexible working options to accommodate parenting and caregiving responsibilities. Moreover, female chemists receive mostly short-term funding and contracts, which

creates uncertainty and unnecessary pressure. Lastly and most importantly, the academic culture is not transparent about recruitment and promotion practices and allows bullying and harassment,⁴ which oftentimes is aimed at under-represented groups⁷.

In the scientific context, groups that prioritize diversity turned out to be more successful in terms of the number of published papers and number of citations per paper. This shows that being inclusive gives teams a competitive edge in science⁸. However, scientific teams are far from being truly diversified, and equal chances are not yet granted to everyone.

WiNS then...

Changing this situation at our university is exactly one of WiNS' missions! WiNS establishes a space for young women in natural sciences to connect and express their support for one another as well as related Swiss initiatives in favour of equal opportunities for marginalized groups. Contrary to VCS, WiNS is a fairly young – but ever-growing – association: In 2014, WiNS was founded as the female association at D-CHAB and was joined by D-BIOL in 2021 as well as D-PHYS and D-MATL in 2023. We represent all female students and scientific members of the four departments.

Our mission is to support female scientists via career engagement and creating a supportive environment.

...and now

WiNS has experienced consistent growth, with 2022 and 2023 being our most transformative years to date. The formation of our current board, now including members from all four departments, took place at our general assembly in March. Last year, we have successfully hosted over 14 events, featuring a teacher panel discussion, a salary negotiation workshop, and even a festive pizza party, which marked one of our largest gatherings in WiNS history!

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Panel Discussion:
Teacher's Diploma

register here:
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NOV 30th
6:00-7:30 PM
HCI G7
followed by
an Aperitivo

open to all!

We would like to emphasize that while we are a female-led association, we warmly

welcome all individuals who support our cause, irrespective of their gender, to participate in our events. Our workshop series on implicit bias was a pivotal initiative that brought increased attention to our association and the issues we address. Furthermore, our monthly *Career Series*, where we spotlight individuals from various professions who have a background in natural sciences, has become a WiNS classic. For two years now, it has continued to inspire our colleagues at ETH.

WiNS presents
CAREER SERIES

OPEN TO ALL

March 15th
6:00-6:30 PM
HCI J7

followed by
an Apéro

Dr. Venita Decker
Product Manager Compact NMR at
sponsored by
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register here!

Starting next autumn, we are very excited to kick-start a **new mentoring program** (for which we are currently recruiting mentors!). As a mentor, you will guide and inspire younger students, as well as share your valuable experience. Anyone above

ⁱThanks go out to Chloé Bazin and the mentoring team at WiNS for the primer!

3rd-year bachelor's, all master's and PhD students, and postdocs are welcome to sign up as mentors. Your role as a mentor will be to answer questions and provide support. A fun networking event for all mentors and mentees will be organised by the WiNS committee. Register as a mentor by filling out the form here <https://docs.google.com/forms/d/e/1FAIpQLSeY3-9v87WoyqIGsH0x8P4sfbz685-UJ-8eVb8swY6GPX2dyQ/viewform> or contacting us via wins@ethz.ch. The application window for mentees will open in the next few months, so stay tuned for more information at the start of HS23!

Ready to make a difference?
Become a Mentor: Empower ETH's Future!

WiNS Mentoring Project

OPEN TO ALL

Come join a relaxed atmosphere!

*Open to all gender 3rd-year Bachelor's, Master's, PhDs and PostDocs

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ETH zürich DCHAB DBIOL DPHYS DMATL WiNS

If you would like to stay updated about all of our events or what our industry and community partners have to offer, you

can [sign up for the newsletter](#)ⁱ on our website. Let us now wrap up with some 'testimonials' from some of our student members...

Voices Of Our Student Members

"I recently joined WiNS and appreciate the spirit and opportunities WiNS creates to support women in natural sciences, such as by hosting the Career Series or offering workshops and company visits. I joined WiNS because I wanted to connect with other women in my field of study and be part of a group of open-minded people who support each other and always strive for more equality at ETH!"

"With WiNS I found a supportive network of women, facing similar everyday challenges as I do in a very male-dominated environment. I was inspired to join when I learned how these young scientists make every effort to improve the situation at our institution for all women, such as seeking conversation with the ETH executive board about very emotional topics. I appreciate the respectful and supportive working environment at this association and I hope lots can already benefit from the positive impact WiNS is making."

"To me, WiNS is an open space, a com-

munity that gives me inspiration and perspective, both in a broad sense (you might say career-related) and personally. It's a place that allows me to grapple with the role assigned to me by society as a woman in natural sciences, to address grievances and injustices, to question the status quo, and to implement change. And I think the output is so cool – the Career Series are amazing, and the menstruation station is often a real lifesaver. Apart from the content, I appreciate the respectful and appreciative environment, and especially the wonderful contacts at WiNS – I highly recommend checking out one of their next events!"

Did we pique your curiosity? The WiNS community is eager to welcome all of you at one of our next events! Dive into our world of exchange, growth, and inspiration by visiting us at wins.ethz.ch or by subscribing to our newsletter (scan the QR code!). We are always happy to welcome interested undergrads and master's students to exchange with PhDs and postdocs and support one another in this inspiring community; see you at our next event!

Sign up for the WiNS newsletter
to stay up-to-date!



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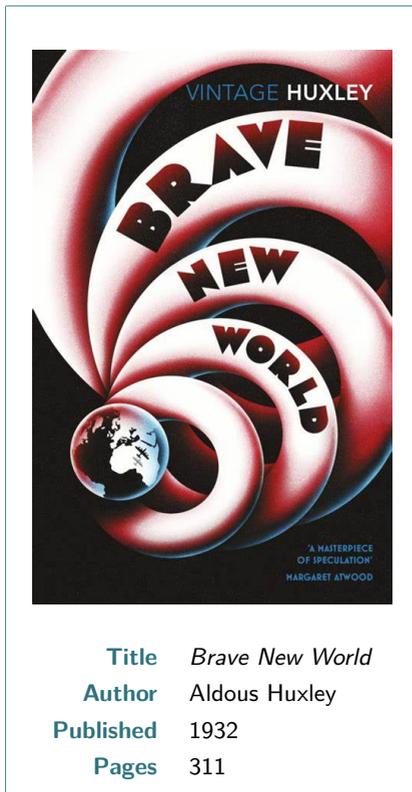
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Buchkritik

“Brave New World” – The most renowned work of Aldous Huxley, or: How the future was imagined in 1932

Daniel Schiller *Brave New World* is a 1932 novel by Aldous Huxley, which is usually categorized as a dystopia, or a vision of an undesirable future. It is both highly influential and unique.



Most other works of dystopian literature, such as *1984*, are either loosely or closely modelled on the actually existing author-

itarian and totalitarian societies of the twentieth century, with an eternal state of emergency or siege, widespread poverty and a ruthless enforcement branch accountable to nobody and nothing. The ruling faction as portrayed in these books relies on **violence and oppression** in order to keep the population in line and itself in power. In *Brave New World*, the government, which encompasses almost the entire globe, uses **more subtle, yet effective** methods in order to maintain a large degree of control over the population.

This firm grip starts even before fertilisation. Virtually all children are conceived and carried in bioreactors. **Everybody's future role in society is determined by the treatment of their stem cells.** Those intended for high-ranking positions are grown from a fertilized egg, while those intended for positions deemed menial are produced from the division of totipotent stem cells and intentionally damaged by the addition of ethanol to their medium. These lower castes are not even true indi-

viduals as they are raised in batches, with all of them being identical. Everybody is subjected to intense conditioning in order to accept their assigned role in society. In order to quell all types of opposition or thoughtfulness, everybody is provided with labour, communal leisure activities and a drug called soma, which slows down the mind and guides the user to the [realm of Morpheus](#).

And what about tolerance?

The society is intolerant by design, as it is intended to eliminate all means of individual differentiation. Some pockets of the previous world do exist, for example in so-called reservations, but these are closely guarded in order to prevent any contact. This is justified by the assertion that the formation of different subdivisions does lead to unrest and, [as its ultimate consequence, global and unlimited war](#), which jeopardizes the future of humanity. The government, therefore, portrays this as a necessary step in order to ensure the survival of humanity. John, who left the reservation he was born in, is assaulted by workers when he publicly speaks out about the lack of liberty within the “brave new world”, and those responsible for his introduction to London are exiled to islands in the middle of the Atlantic Ocean.

However, it is still clearly noticeable that the book was written in the early 1930ies: microelectronics are unimaginable and people still listen to the news on the radio. News in the traditional sense has become meaningless due to the degree of stability the society has reached. The [“Fordian” culture](#) puts stability above everything. Technological, scientific and societal progress are curtailed in order to stabilize the global community as a whole. The Athenaeum Club, which is a traditional London gentlemen’s club frequented by mostly scientists and artisans, has been replaced by the Aphroditaeum. In other words, [wisdom is superceded by lascivity](#).

This is, of course, only a short summary of a long book, which is oftentimes quoted in order to criticize the advancements of modern biotechnology, which did not yet exist at the time the novel was written. Therefore, it is unlikely that the primary target of the criticism is biotechnology. As far as I know, no fertilized egg has been raised to the point of being capable of living independently outside of a human to date. Instead, it criticizes the consumerist society that is enabled by mass production. [Henry Ford serves as the idol of this society](#) even though, ironically, individual car ownership is low.

Personally, I found *Brave New World* rather tedious to read, which might be due to its long-winded phrasing. It is, however, ranked fifth in a compilation of the best English novels of the 20th century¹.

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Filmkritik

«Intolerance» von D.W. Griffith

Lukas Heckendorn Ich hab's getan! Ich habe mir die gesamten 2 Stunden und 43 Minuten reingezogen und jetzt schreib ich auch noch eine Kritik darüber. Meine Englischlehrerin aus dem Gymnasium wäre so stolz auf mich. Genug des Selbstlobes, um was gehts?

In vier Handlungssträngen erzählt D.W. Griffith über die Grausamkeit der Menschheit und darüber, wie Intoleranz in verschiedenen Zeiten und Kulturen zu Gewalt und Zerstörung führen kann. Die Schicksale einzelner Charaktere werden ineinander verwoben und durch das Bild einer Ur-Mutter letztendlich in einem grossen gesamthaften Rahmen erzählt. Dabei befinden sich die Figuren des Films in unterschiedlichen Epochen der Menschheitsgeschichte, nämlich 539 Jahre vor Christus beim Fall Babylons während der Herrschaft Balthasars, zur Zeit der Kreuzigung von Jesus Christus, bei der Bartholomäusnacht im 16. Jahrhundert vor dem Hintergrund der französischen Renaissance und in der Gegenwart des Films, also rund um das Jahr 1916.

Richtig gelesen: 1916! Dieser Stummfilm ist über 100 Jahre alt, aber kein bisschen verstaubt! Die Schauplätze sind auf au-

thentische Art und mit extrem hohem Aufwand fürs Detail ausgestaltet. Etwa die Szene von der Belagerung der Stadt



Für Normalverbraucher



Für Freaks

Babylon kann es durch ihre prächtigen

Kostüme der tausenden von Statisten mit manch einem Film aufnehmen, vielleicht wird hier und da schon fast zu dick aufgetragen. Nicht ohne Grund zählt *Intolerance* noch heute als teuerster Film aller Zeiten. Durch zahlreiche Spezialeffekte und die sogenannte Parallelmontage, bei der Szenen aus verschiedenen Orten oder Zeiten so miteinander verknüpft werden, dass sie die dramatische Wirkung einer zusammenhängenden Erzählung verstärken, legte dieser ganz spezielle Film den **Grundstein des modernen Kinos**.

Du siehst wohl schon, auf welchen Punkt meine Filmempfehlung dieses Mal hinausläuft: Film-Freaks mit verschiedenen Interessen lege ich *Intolerance* wärmstens ans Herz. Auch kritische Zeitzeugen werden ihr Interesse an diesem Film haben. Natürlich findet die Handlung vor einem Hintergrund statt, in den man erst einmal eintauchen muss. Trotzdem erkenne ich überraschend viele Muster und Me-

chanismen in der dargestellten Unmenschlichkeit wieder, was mich beim Blick auf aktuelle Zeiten nachdenklich stimmt. **Haben wir uns in unserem gesellschaftlichen Handeln seit 1916 so wenig weiterentwickelt?** Gerade weil dieser Film inhaltlich so zeitlos ist und als so wegweisendes Werk für das moderne Kino gilt, ist er zumindest einen Einblick wert. Wenn du also schon bis zu diesem Punkt meiner Filmkritik durchgehalten hast, dann will ich dir empfehlen, zumindest den einen oder anderen Blick in das Werk zu werfen. Du findest eine restaurierte Fassung übrigens auf Youtube¹.

Quellen

- [1] <https://www.youtube.com/watch?v=SyqDQn0Xa70>



Sudoku

				7			4	
		8	4				1	
	4		6	9				7
		9		5				8
4		3	7		8	9		1
1				3		7		
3				8	7		2	
	5				6	1		
	6			1				

Sudoku 1

						4	3	
6		7	4		5			8
			9				5	6
		5						7
2	7	6		1		5	9	4
4						3		
5	4				8			
9			7		6	8		5
	6	8						

Sudoku 3

5					3		1	
3	1				8	2	9	
		2	1					
1	4				7	8		
2				8				3
		9	3				6	1
					5	9		
	2	5	8				4	7
	8		7					2

Sudoku 2

2		5			1	4		3
6	4	8	3	2	5			
	6		2					7
		3				5		
5					8		6	
			7	1	4	8	3	2
4		1	8			9		5

Sudoku 4



CHEMIE

MEMES

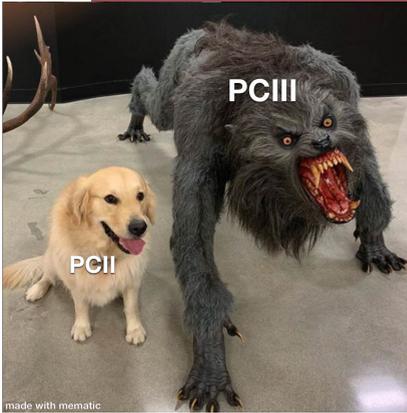


Wenn man Übungsstunden im HIT hat

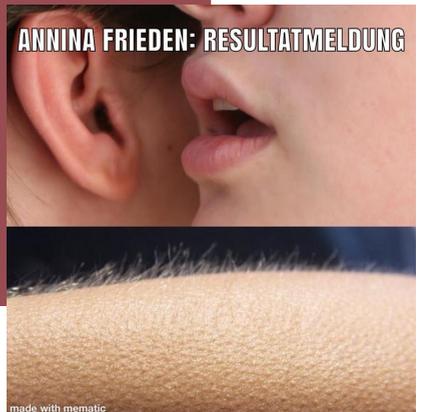


Wenn man mal wieder nen tiefen Zug vom Ammoniak nimmt





Girls, let's
confuse the
boys erstis!



Sudoku Solutions

9	1	6	8	7	3	5	4	2
7	3	8	4	2	5	6	1	9
5	4	2	6	9	1	3	8	7
6	7	9	1	5	4	2	3	8
4	2	3	7	6	8	9	5	1
1	8	5	9	3	2	7	6	4
3	9	1	5	8	7	4	2	6
8	5	7	2	4	6	1	9	3
2	6	4	3	1	9	8	7	5

Solution to sudoku 1

8	5	1	2	6	7	4	3	9
6	9	7	4	3	5	1	2	8
3	2	4	9	8	1	7	5	6
1	3	5	6	4	9	2	8	7
2	7	6	8	1	3	5	9	4
4	8	9	5	7	2	3	6	1
5	4	2	1	9	8	6	7	3
9	1	3	7	2	6	8	4	5
7	6	8	3	5	4	9	1	2

Solution to sudoku 3

5	7	8	2	9	3	6	1	4
3	1	4	6	7	8	2	9	5
6	9	2	1	5	4	3	7	8
1	4	3	5	6	7	8	2	9
2	6	7	9	8	1	4	5	3
8	5	9	3	4	2	7	6	1
7	3	1	4	2	5	9	8	6
9	2	5	8	3	6	1	4	7
4	8	6	7	1	9	5	3	2

Solution to sudoku 2

2	7	5	9	6	1	4	8	3
1	3	9	4	8	7	2	5	6
6	4	8	3	2	5	7	1	9
8	6	4	2	5	3	1	9	7
7	1	3	6	4	9	5	2	8
5	9	2	1	7	8	3	6	4
9	5	6	7	1	4	8	3	2
3	8	7	5	9	2	6	4	1
4	2	1	8	3	6	9	7	5

Solution to sudoku 4



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VCS an die Umwelt, will die Exsi-
Kommission die Druckauflage gleich
gross wie die Nachfrage halten. Wer
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