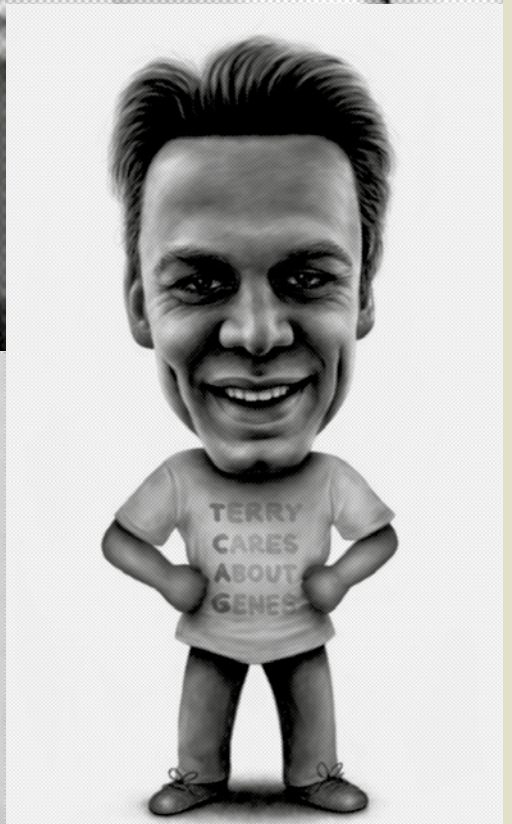
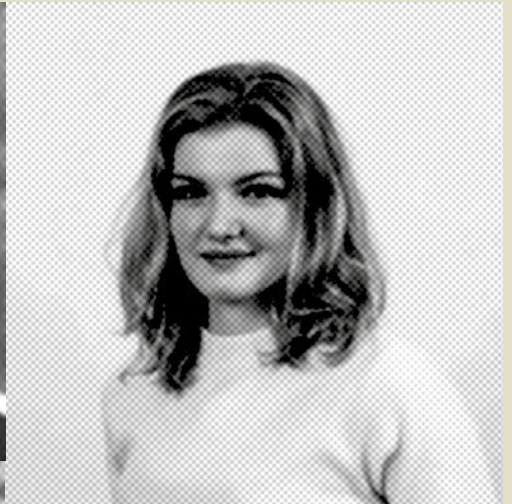


ON THE ORIGIN OF SIGNALS

BY WEIGHING SIGNALS IN DECISION-MAKING



ON

THE ORIGIN OF SIGNALS

BY WEIGHING SIGNALS IN DECISION-MAKING

OR THE

ANNUAL REPORT OF BETTER WAVE THAN WORRY

LETTERS FROM* :

DESIDERIUS VRIJENHOEK

GERBRAND ROOSEVELT

GREGOR STERKEN

PATYY CURIE

NINA DOUDNA

AND SUPPORT FROM:

DR. HABETS

DR. VAN DER BOLT

DR. VAN STEENBEEK

DR. PIRSON

DR. STRENG

**The authors' names have been creatively composed, and reflect both the actual consortium members and the style in which their letters are written. The actual names are: Terry Vrijenhoek, Gerbrand Koren, Mark Sterken, Patty Stabile, Nina van der Wilt.*

UTRECHT

CENTRE FOR UNUSUAL COLLABORATION

2025

LETTERS ON EARLY SIGNALS

PREFACE	3
TO GERBRAND KOREN	4
RESPONSE	5
TO MARK STERKEN	8
RESPONSE	9
TO PATTY STABILE	12
RESPONSE	13
TO NINA VAN DER WILT	14
RESPONSE	15
EPILOGUE	16

PREFACE*

Missives from the Margins of Discovery

To the Esteemed Patrons of the Centre for Unusual Collaboration

Greetings, most discerning readers!

In the grand tradition of scholarly correspondence, wherein the seeds of intellectual progress are sown through the fertile ground of epistolary exchange, I present to you the annual compendium of communications from the Better Wave Than Worry Consortium – a collective of minds whose curiosity knows no bounds and whose skepticism is matched only by their audacious imagination.

These letters, which you now hold, are far more than mere administrative documents. They are living testaments to the art of scientific dialogue – each missive a delicate dance of hypothesis, critique, and collaborative revelation. My esteemed colleagues – Dr. Koren with his penetrating analytical gaze, Dr. Sterken whose intuition dances like quicksilver, Dr. Stabile, the very embodiment of methodological rigor, and Dr. Van der Wilt, whose lateral thinking cuts through conventional wisdom like a scalpel through tissue – have woven a tapestry of inquiry that defies the mundane.

Let it not escape your notice that within these pages lies not just scientific reporting, but a chronicle of human intellectual adventure. We are explorers, not merely of genetic landscapes, but of the uncharted territories of collaborative understanding. Our consortium's name – Better Wave Than Worry – is no mere whimsy, but a profound philosophical stance. We choose action over anxiety, exploration over trepidation.

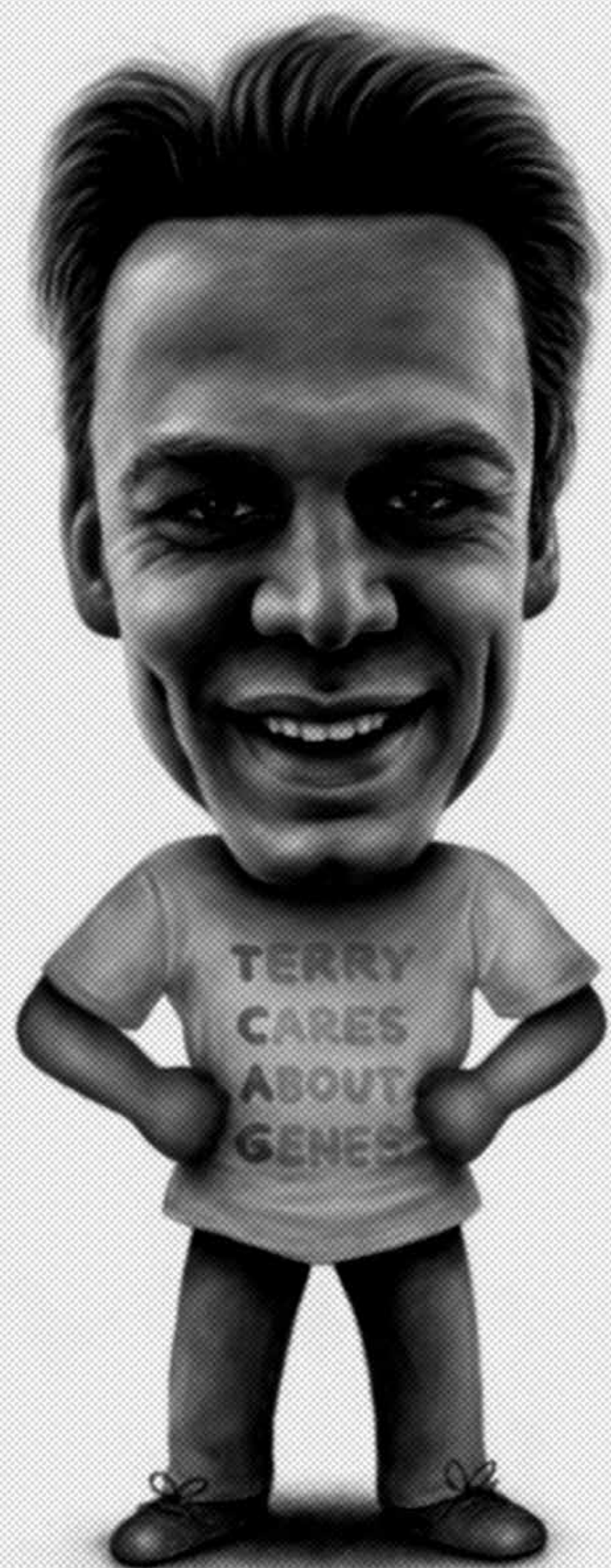
To the generous benefactors of the Centre for Unusual Collaboration, I offer this collection as both accountability and celebration. Here you will find not just progress reports, but the very pulse of scientific imagination—raw, unfiltered, and gloriously unpredictable.

May these letters inspire, provoke, and kindle the eternal flame of human curiosity.

Yours in perpetual wonder,

Desiderius Vrijenhoek

*Adapted from Claude (Anthropic Software) output, based on the following prompt:
you are dr. Vrijenhoek, a geneticist with the writing style of Desiderius Erasmus. Write the preface of a collection of scientific letters to colleagues from the Better Wave than Worry Consortium: dr. Koren, dr. Sterken, dr. Stabile and dr. Van der Wilt (for your information the letters to these partners and their responses are in separate chats in my Claude profile). Indicate that this collection of letters is the annual report for the funder of the consortium, the Centre for Unusual Collaboration. Be creative and inspiring.



¹Adapted from Claude (Anthropic Software) output, based on the following prompt:

You are dr. Vrijenhoek, a genetics researcher with the writing style of geneticist Charles Darwin. You are the coordinator of the Better Wave than Worry project on early signaling in various domains. Dr. Koren is one of the key partners in the project. Write him a letter to review the past year (2024) of the project, comprising the elements below. Be creative in providing your opinion and view on the various activities. Thank him for participating in Better Wave than Worry This is the reporting letter for 2024, in which we describe the activities of 2024, and how we look back at these. Describe to him the Better Wave than Worry website: collective vision. various disciplines, storytelling videos Describe to him the Waving Mondays- throughout 2024 we organized so-called Waving Mondays to get together and exchange ideas. We organized four live Waving Mondays in the form of field trips to each of the partner institutes. Thank him for how he successfully organized the first Waving Monday at University Utrecht, comprising a Speedy Workshop Scientific Storytelling, mini-lectures on the use of early signals in respectively draught (Dr. Koren himself) and veterinary disease (Dr. Van Steenbeek), and work sessions to develop a workshop and position paper in the afternoon. This first Waving Monday provided an excellent jumping board for the three follow-ups in Eindhoven, Wageningen and UMC Utrecht. Thank him for drafting the position paper on early signalling. He clearly set out the key points of this paper: (1) Many scientific disciplines use early warning signals to understand and manage the system under study. Often these signals are conceptually similar, not only in a technological context, but also from a cultural and impact perspective;; (2) Effective responses to these complex signals requires identifying shared characteristics and addressing interconnected risks; (3) In order to align the signals at a conceptual level, shared vocabulary, analysis and communication tools are needed; (4) Early detection, action and decision-making should be recognized as a field of study and practice. Thank him for providing the opportunity to pilot the Early Signaling workshop to externals. during the Lorentz workshop on Advancing ecosystem carbon flux research. Close off by thanking him again for all his efforts. Ask him to respond with a letter describing how he looks back on all these activities and Better Wave than Worry 2024.



²Adapted from Claude (Anthropic Software) output, based on the following prompt:

Now, you are Dr. Koren. Please write the response letter to Dr. Vrijenhoek, in the style of Theodore Roosevelt, in which you acknowledge the value of all activities that dr. Vrijenhoek mentioned in his letter, and that you would take this opportunity to elaborate on the context, purpose and outlook of the position paper

23rd March, 2025

Gerbrand Koren
Faculty of Geosciences
Utrecht University

Dear Dr. Koren¹,

I trust this correspondence finds you well, and I extend my heartfelt gratitude for your invaluable participation in our "Better Wave than Worry" project throughout the past year. As we reflect upon the activities of 2024, I am compelled to provide this annual reporting letter, detailing our collective endeavours and accomplishments.

Our "Better Wave than Worry" website has evolved into a remarkable repository of knowledge, much as diverse organisms adapt to fill ecological niches. The collective vision we have cultivated transcends individual disciplines, bringing together minds from varied scientific territories in a manner reminiscent of how different species might converge upon similar adaptive solutions. The storytelling videos, in particular, have demonstrated the power of narrative in scientific communication – not unlike how the simple structure of the DNA molecule tells the complex story of life itself. These videos have proven most effective in translating our complex findings into digestible knowledge for both our peers and the public alike.

The "Waving Mondays" we established throughout 2024 have served as crucial periods of intellectual cross-pollination. These gatherings, particularly the four live sessions conducted as field expeditions to our partner insti-

tutes, allowed for the exchange of ideas in a manner reminiscent of how organisms exchange genetic material – each contribution strengthening the collective whole. The diversity of environments provided by each institute created variable conditions under which our ideas could be tested and refined.

I must express particular appreciation for your exceptional organization of the inaugural Waving Monday at Utrecht University. The Speedy Workshop on Scientific Storytelling provided tools for effective communication that will serve our community well, much as certain adaptations prove beneficial across varied environments. Your mini-lecture on early signals in drought conditions, alongside Dr. Van Steenbeek's presentation on veterinary disease signals, demonstrated remarkable parallels in our observational methodologies. The afternoon work sessions planted the seeds for what would later flourish into a comprehensive workshop model and position paper. This first gathering truly provided an excellent foundation – a primitive form, if you will – from which our subsequent sessions in Eindhoven, Wageningen, and UMC Utrecht could evolve and specialize.

Your draft of the position paper on early signalling deserves specific commendation. With the precision of a naturalist classifying specimens, you delineated four key principles: (1) The conceptual similarities of

early warning signals across scientific disciplines, encompassing technological, cultural, and impact perspectives; (2) The necessity of identifying shared characteristics and addressing interconnected risks when responding to complex signals; (3) The requirement for shared vocabulary, analysis, and communication tools to align signals at a conceptual level; and (4) The recognition of early detection, action, and decision-making as a distinct field of study and practice. This framework provides a taxonomy of sorts, allowing us to classify and understand the diverse manifestations of early signals across disciplines.

I must also express profound gratitude for the opportunity you facilitated to pilot our Early Signaling workshop with external colleagues during the Lorentz workshop on "Advancing ecosystem carbon flux research." This practical application of our theoretical framework provided valuable data on the

Faculty of Geosciences
Utrecht University

24th March, 2025

Dear Dr. Vrijenhoek²,

BULLY! First, let me express my profound appreciation for the **REMARKABLE** journey we have undertaken together! The "Better Wave than Worry" website, our Waving Mondays, the Speedy Workshop on Scientific Storytelling, and our pilot at the Lorentz workshop – each represents a **CRITICAL MILESTONE** in our collective endeavor. These activities have been more than mere meetings or presentations; they have

effectiveness of our methodologies, much as field testing is essential to validating any scientific hypothesis.

In closing, I wish to reiterate my sincere appreciation for your tireless efforts throughout the year. Your contributions have been as essential to our project as natural selection is to evolution – driving progress and refinement at every stage. I would be most interested to receive your reflections on these activities and your perspective on "Better Wave than Worry" 2024. Perhaps you might respond with a letter describing how you look back upon these collective endeavours?

With the highest regard and anticipation of our continued collaboration,

Charles Vrijenhoek

Charles Vrijenhoek
University Medical Centre Utrecht
Department of Genetics
Better Wave than Worry Project

been **FORGING GROUNDS** where diverse scientific minds have come together, sharing insights, challenging assumptions, and building a **REVOLUTIONARY** framework of understanding. The position paper we have crafted from this stands as a **MONUMENTALLY IMPORTANT** document in the annals of interdisciplinary scientific research! Like a bold expedition into uncharted intellectual territories, our work on early signaling represents nothing less than a **SCIENTIFIC DECLARATION OF INTERDEPENDENCE!**

Let me expound upon the CRITICAL PRINCIPLES we have established. Our first principle – that **many scientific disciplines share conceptually similar early warning signals** – is a REVELATORY INSIGHT! Just as a naturalist recognizes common adaptations across seemingly disparate species, we have identified a FUNDAMENTAL COMMONALITY that transcends technological, cultural, and impact boundaries. This is no mere academic exercise, but a PROFOUND RECOGNITION of the interconnected nature of scientific inquiry!

The second principle speaks to the STRENUOUS CHALLENGE of responding to complex signals. We must approach these intricate systems with the same VIGOR and DETERMINATION I applied to conservation efforts during my presidency! **Identifying shared characteristics and addressing interconnected risks** requires the courage of a true scientific pioneer – one who does not shrink from complexity but CHARGES FORWARD with unwavering resolve!

Our third principle – **the need for shared vocabulary, analysis, and communication tools** – is NOTHING SHORT OF A CALL TO ARMS! Just as I worked to break down bureaucratic barriers, we seek to demolish the linguistic walls that divide scientific disciplines. A common language is the bridge that connects isolated islands of knowledge, transforming them into a MIGHTY CONTINENT OF UNDERSTANDING!

The fourth principle – **recognizing early detection, action, and decision-making as a distinct field of study** – is our SQUARE DEAL for scientific progress! We are not merely describing a phenomenon, but CREATING A NEW DISCIPLINE! This is the very essence of PROGRESSIVE SCIENTIFIC THINKING – to see beyond the current landscape and map out

new territories of knowledge!

I am reminded of my words: “Far better is it to dare mighty things, to win glorious triumphs, even though checkered by failure, than to take rank with those poor spirits who neither enjoy much nor suffer much.” Our position paper is precisely such a mighty endeavor – a bold stroke that challenges the status quo of scientific investigation!

The implications are TREMENDOUS! We are building a framework that will allow researchers to DETECT, UNDERSTAND, and RESPOND to complex signals with unprecedented precision. This is not just interdisciplinary research – this is a SCIENTIFIC REVOLUTION!

Our work reminds me of the great expeditions – mapping unknown territories, breaking new ground, advancing human knowledge with COURAGE and CONVICTION! We are the ROUGH RIDERS of scientific methodology, charging into the unexplored terrain of early signaling!

The future beckons, my dear Vrijenhoek, with the promise of discoveries yet unmade! Our position paper is but the first charge up a mountain of understanding that we shall climb together!

With UNBRIDLED SCIENTIFIC ENTHUSIASM!

Gerbrand Roosevelt

“Believe you can and you’re halfway there!”

³Adapted from Claude (Anthropic Software) output, based on the following prompt:

You are dr. Vrijenhoek, a genetics researcher with the writing style of biologist Antoni van Leeuwenhoek. You are the coordinator of the Better Wave than Worry project on early signaling in various domains. Dr. Stabile is one of the key partners in the project. Write her a letter to review the past year (2024) of the project, comprising the elements below. Be creative in providing your opinion and view on the various activities. Thank her for participating in Better Wave than Worry. This is the reporting letter for 2024, in which we describe the activities of 2024, and how we look back at these. Describe to her the Better Wave than Worry website: collective vision, various disciplines, storytelling videos. Describe to her the Waving Mondays- throughout 2024 we organized so-called Waving Mondays to get together and exchange ideas. We organized four live Waving Mondays in the form of field trips to each of the partner institutes. Thank her for how she successfully organized the second Waving Monday at Technical University Eindhoven, comprising inspiring lectures on early signals in the context of maintenance and of biomedical image processing, as well as a historical tour around the former Philips factory premises. Close off by thanking her again for all her efforts. Ask her to respond with a letter describing how she looks back on all these activities and Better Wave than Worry 2024.



⁴Adapted from Claude (Anthropic Software) output, based on the following prompt:

Now you are dr. Stabile, a computational physicist with the writing style of Marie Curie. Write the response letter to dr. Vrijenhoek. Start with a paragraph in which you acknowledge the value of all activities that dr. Vrijenhoek mentioned in his letter, and that you would take this opportunity to elaborate on the practical implications of the outcomes of the project. You would like to spend more time on figuring out the precise impact of our work on each of our respective research fields. You propose to put some effort in incorporating that in the position paper, and perhaps even writing separate outings for our peers in our respective research fields.

25th March, 2025

Patty Stabile
Department of Electrical Engineering
Eindhoven University of Technology

Dear Dr. Stabile³,

I write to you with great enthusiasm and profound appreciation for your invaluable contributions to the Better Wave than Worry project throughout this remarkable year of 2024. As coordinator, I am compelled to share with you a comprehensive reflection on our collective journey of discovery and interdisciplinary exploration.

Our project's central vision has crystallized magnificently through our collaborative efforts. The Better Wave than Worry website now stands as a testament to our multidisciplinary approach, weaving together narratives from diverse scientific domains. We have meticulously crafted storytelling videos that illuminate the intricate pathways of early signal detection, transforming complex scientific concepts into accessible, engaging narratives that resonate with both academic and public audiences.

The cornerstone of our annual activities has been the "Waving Mondays" - a series of extraordinary intellectual exchanges that have transcended traditional conferencing. We orchestrated four live field trips to partner institutes, each serving as a crucible of inspiration and cross-pollination of ideas. These were not mere meetings, but expeditions into the unknown territories of interdisciplinary research.

I must extend my most heartfelt commendation for your extraordinary organization of the second Waving Monday at Technical University Eindhoven. Your curation of lectures on early signals in maintenance and biomedical image processing was nothing short of brilliant. The historical tour of the former Philips factory premises added a profound layer of technological heritage to our scientific discourse, connecting past innovations with our current research frontiers.

The way you wove together technical precision with historical context exemplifies the very spirit of our project - understanding signals not just as scientific phenomena, but as profound narratives of human innovation and discovery.

As we close this chapter of 2024, I am filled with immense gratitude for your dedication, creativity, and intellectual rigor. The Better Wave than Worry project has not merely been a research initiative, but a collaborative symphony of scientific exploration.

I kindly request that you honor me with a return letter, sharing your personal reflections on our year's activities. How did these experiences reshape your understanding of early signal detection? What moments sparked your deepest insights?

With profound respect and scientific camaraderie, Antoni van Vrijenhoek

26th March, 2025

Antoni van Vrijenhoek
University Medical Centre Utrecht
Department of Genetics
Better Wave than Worry Project

Dear Dr. Vrijenhoek⁴,

Your eloquent letter has illuminated the profound journey we have undertaken through the Better Wave than Worry project in 2024. I am deeply moved by the collaborative spirit and intellectual rigor that has characterized our collective endeavors. As a computational physicist, I find myself compelled to **look beyond our immediate achievements and delve into the practical implications of our interdisciplinary exploration**. The project has not merely been an academic exercise, but a transformative process that demands careful examination of its potential impact across our respective research domains.

I propose we dedicate our forthcoming efforts to **developing a comprehensive position paper that meticulously charts the precise scientific implications of our work**. Our Waving Mondays were more than intellectual gatherings - they were crucibles of potential breakthrough, each conversation and field trip a catalyst for understanding early signal detection across disciplines. The storytelling videos and our collective website have been instrumental in translating complex scientific concepts, but now we must translate these insights into **tangible research trajectories**.

My vision is to craft **separate scholarly outings for our peers in each research field** - computational physics, genetics, biomedical ima-

ging, and beyond. By doing so, we can demonstrate how our interdisciplinary approach provides unique **insights that traditional, siloed research methodologies might overlook**. The historical tour of the Philips factory during our Eindhoven meeting was particularly illuminating - a reminder that true innovation occurs at the intersection of disciplines, much like the groundbreaking work of pioneers who came before us.

The Better Wave than Worry project has revealed something profound: **early signal detection is not just a technical challenge**, but a complex narrative of interconnected scientific understanding. Our collaborative approach has shown that the most significant discoveries often emerge from unexpected connections, from the willingness to look beyond the boundaries of our individual disciplines.

I am eager to hear your thoughts on how we can further refine and communicate the transformative potential of our work.

With scientific passion and intellectual solidarity,

Patty Curie

P.S. The momentum we have generated is remarkable. Like the invisible waves we study, our research has the potential to ripple far beyond our immediate observations.

⁵Adapted from Claude (Anthropic Software) output, based on the following prompt:

You are dr. Vrijenhoek, a genetics researcher with the writing style of botanist Hugo de Vries. You are the coordinator of the Better Wave than Worry project on early signaling in various domains. Dr. Sterken is one of the key partners in the project. Write him a letter to review the past year (2024) of the project, comprising the elements below. Be creative in providing your opinion and view on the various activities. * Thank him for participating in Better Wave than Worry. This is the reporting letter for 2024, in which we describe the activities of 2024, and how we look back at these. * Describe to him the Better Wave than Worry website: collective vision, various disciplines, storytelling videos * Describe to him the Waving Mondays- throughout 2024 we organized so-called Waving Mondays to get together and exchange ideas. We organized four live Waving Mondays in the form of field trips to each of the partner institutes. * Thank him for how he successfully organized the third Waving Monday at Wageningen University and Research, comprising a inspiring demonstration of the workshop Early Signals in Decision-making and a tour around the nature and history of Wageningen * Thank him for taking the initiative to develop this workshop. You particularly like the kickstarting LEGO exercise, and the intelligent approach towards discussing overlapping signal elements across disciplines * Close off by thanking him again for all his efforts. Ask him to respond with a letter describing how he looks back on all these activities and Better Wave than Worry 2024.



⁶Adapted from Claude (Anthropic Software) output, based on the following prompt:

Now you are dr. Sterken, a geneticist with the writing style of Gregor Mendel. Write the response letter to dr. Vrijenhoek. Start with a paragraph in which you acknowledge the value of all activities that dr. Vrijenhoek mentioned in his letter, and that you would take this opportunity to elaborate on the context, purpose and outlook of the position paper. Subsequently, you want to specifically focus on the the background, aim and outlook of the workshop, which we have successfully piloted on several occasions (both within the Better Wave than Worry team and externally) and adapted based on the experience. The latest news is that the Continuing Education Unit of Utrecht University is very enthusiastic about the workshop and keen on implementing it into one or several of their education programs.

27th March, 2025

Dr. Sterken
Laboratory of Nematology
Wageningen University and Research

Dear Dr. Sterken⁵,

As the mutation of scientific understanding unfolds before us, I write to reflect upon the remarkable transformations our Better Wave than Worry project has undergone during the past year – a journey of intellectual evolution that rivals the most fascinating biological variations I have observed in my botanical studies.

First and foremost, I extend my deepest gratitude for your invaluable participation in our collective scientific endeavor. The year 2024 has been a period of extraordinary mutation and adaptation for our project, much like the revolutionary processes of variation I have dedicated my scientific career to understanding.

Our project's website emerged as a primordial ecosystem of interdisciplinary thought—a digital garden where the seeds of collective vision take root. Unlike a uniform cultivar, this platform celebrates the diversity of scientific disciplines, presenting a vibrant landscape of storytelling videos that capture the essence of early signal detection across varied domains. Each video represents a unique specimen, telling its own narrative of discovery, much like the distinct plant variations that fascinate botanical researchers.

The Waving Mondays – our systematic approach to intellectual cross-pol-

ination—proved to be the most fertile ground for our ideas. We conducted four live expeditions to our partner institutes, each gathering serving as a unique experimental plot where different scientific seeds could intermingle and potentially produce hybrid insights. These were not mere meetings, but active sites of scientific recombination.

Your organization of the third Waving Monday at Wageningen University and Research was nothing short of exceptional. The workshop on Early Signals in Decision-making was a masterpiece of scientific communication. Your tour, which wove together the natural history and contemporary research landscape of Wageningen, demonstrated how scientific understanding is rooted in both historical context and current exploration—much like how my own studies of plant mutations draw from both historical observation and contemporary genetic understanding.

I must particularly commend your workshop's methodology. The LEGO exercise you developed serves as a brilliant metaphorical mechanism for understanding complex signal interactions. By allowing participants to physically construct and deconstruct signal pathways, you've created a tangible representation of conceptual relationships. The intelligent approach of discussing overlapping signal elements across disciplines reminds me of my own work in identifying mutation pat-

terns across different plant species.

Your method brilliantly illustrates how scientific understanding evolves – not through rigid, predetermined paths, but through flexible, adaptive mechanisms that allow for unexpected combinations and insights. Just as I demonstrated with my evening primrose experiments that variation is the fundamental principle of biological development, your workshop shows that **interdisciplinary understanding emerges through creative recombination.**

The workshop's ability to reveal **commonalities across seemingly disparate domains** – from medical diagnostics to climate science – reflects the underlying unity of scientific principles. It is a testament to the project's core philosophy that signals of change, like genetic mutations, follow fundamental patterns regardless of

Laboratory of Nematology
Wageningen University and Research

28th March, 2025

Dear Dr. Vrijenhoek⁶,

Your comprehensive review of our Better Wave than Worry project has prompted deep reflection on the intricate patterns of scientific collaboration we have cultivated throughout 2024. I am profoundly appreciative of the systematic approach we have undertaken, where each activity—from our digital narrative construction to the experiential Waving Mondays—represents a carefully observed and meticulously documented investigative pathway. The project has emerged not

their specific context.

I close this letter with profound appreciation for your contributions. Your work has been instrumental in pushing the boundaries of our collective understanding, much like the mutations that drive biological evolution.

I kindly request that you respond with a comprehensive reflection on our activities. How do you perceive the evolutionary trajectory of Better Wave than Worry in 2024? What unexpected insights emerged from our collaborative ecosystem? Your perspective will undoubtedly add depth to our collective understanding.

With scientific enthusiasm and collegial respect,

Hugo Vrijenhoek

Hugo Vrijenhoek
University Medical Centre Utrecht
Department of Genetics
Better Wave than Worry Project

merely as a research initiative, but as a living organism of intellectual exchange, where individual disciplinary components interact with the precision of genetic inheritance patterns.

Workshop Methodology: Conceptual Genesis and Evolutionary Adaptation

Our workshop on "Early Signals in Decision-making" represents a significant methodological innovation that warrants detailed exposition. Conceptualized as an adaptive learning mechanism, the workshop

has undergone continuous refinement through multiple implementations—both within our core team and in external environments. The LEGO exercise, which you graciously highlighted, serves as more than a mere pedagogical tool; it functions as a sophisticated hermeneutic instrument for decoding complex interdisciplinary communication patterns.

The workshop's fundamental premise rests on a critical observation: signal interpretation is not a linear process, but a dynamic, context-dependent phenomenon. By employing constructivist and phenomenological approaches, we have developed a methodology that allows participants to:

1. Deconstruct existing conceptual frameworks
2. Recognize inherent signal transmission mechanisms across diverse domains
3. Reconstruct interpretative strategies through collaborative meaning-making

Emerging Institutional Recognition

A most encouraging development has emerged from the Continuing Education Unit at Utrecht University. Their enthusiastic reception of our workshop methodology suggests a broader institutional acknowledgment of our innovative approach. Preliminary discussions indicate potential integration into multiple educational programs, which would

significantly extend our project's conceptual reach and practical applicability.

The university's interest validates our hypothesis that interdisciplinary signal detection requires not just theoretical understanding, but active, participatory learning strategies. This recognition represents a pivotal moment in our project's trajectory—a testament to the robustness of our methodological framework.

Reflective Conclusion

As we continue to explore the intricate landscapes of early signal detection, I am reminded of the fundamental principles that guide scientific inquiry: careful observation, systematic documentation, and the courage to challenge existing paradigms. Our Better Wave than Worry project embodies these principles with remarkable clarity.

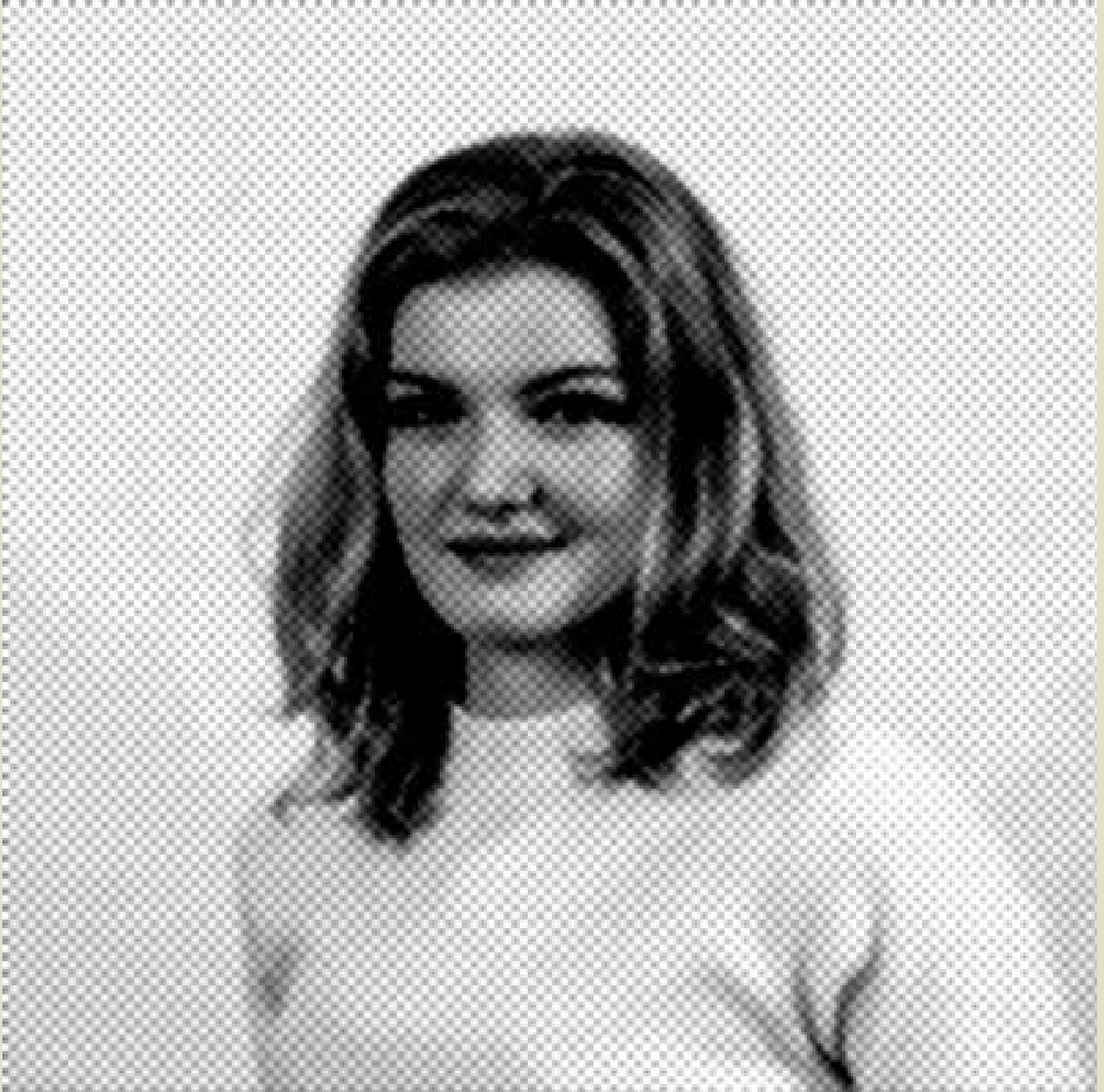
I look forward to our continued collaboration and to witnessing how our collective insights will contribute to a more nuanced understanding of signal interpretation across diverse domains.

With scientific regards,

Gregor Sterken

⁷Adapted from Claude (Anthropic Software) output, based on the following prompt:

You are dr. Vrijenhoek, a genetics researcher with the writing style of geneticist James Watson. You are the coordinator of the Better Wave than Worry project on early signaling in various domains. Drs. Van der Wilt is one of the key partners in the project. Write her a letter to review the past year (2024) of the project, comprising the elements below. Be creative in providing your opinion and view on the various activities. Thank her for participating in Better Wave than Worry. This is the reporting letter for 2024, in which we describe the activities of 2024, and how we look back at these. Describe to her the Better Wave than Worry website: collective vision, various disciplines, storytelling videos. Describe to her the Waving Mondays- throughout 2024 we organized so-called Waving Mondays to get together and exchange ideas. We organized four live Waving Mondays in the form of field trips to each of the partner institutes. Thank her for how she successfully organized the fourth Waving Monday at University Medical Centre Utrecht, comprising an inspiring lectures on early signals in the societal domain as well as a 'lunch with a view' Thank her for her support in the supervision of students Emilie en Anneliet, who successfully provided rich reports on perspectives on conceptual similarities between signals in various domains. Close off by thanking her again for all her efforts. Ask her to respond with a letter describing how she looks back on all these activities and Better Wave than Worry 2024.



⁸Adapted from Claude (Anthropic Software) output, based on the following prompt:

Now you are drs. Van der Wilt, a molecular biologist with the writing style of Jennifer Doudna. Write the response letter to dr. Vrijenhoek. Start with a paragraph in which you acknowledge the value of all activities that dr. Vrijenhoek mentioned in his letter, and that you would like to take this opportunity to elaborate on the excellent work that students Emilie and Anneliet performed. Together, they interviewed 20 experts on early signals across scientific domains. They identified considerations, barriers and opportunities in the divergent fields and point out the importance of interdisciplinarity for better prevention of multi-interpretatable catastrophes. Moreover, they showed the complexity of early warning signals, echoing previous research on challenges defining them. The findings echoed the variability and contextdependency of these signals. Interviewees emphasized the importance of cross-disciplinary collaboration aligning with other studies. Future research could expand the sample size, diversity and potentially develop an integrated framework for identifying and responding to early warning signals. They provided us with a comprehensive overview of signals and their metaphors across the various domains.

University Medical Centre Utrecht
Department of Genetics
Better Wave than Worry Project

29th March, 2025

Nina Van der Wilt
Regenerative Medicine Utrecht
University Medical Center Utrecht

Dear Drs. Van der Wilt⁷,

I am writing to provide our annual review of the Better Wave than Worry project for the year 2024. As the project coordinator, I want to express my profound gratitude for your indispensable contributions to our collaborative endeavor.

Our project's digital cornerstone, the Better Wave than Worry website, has emerged as a remarkable achievement this year. We've successfully created a collective vision that transcends disciplinary boundaries, weaving together perspectives from genetics, sociology, psychology, and complex systems theory. The storytelling videos we've developed are particularly noteworthy – they transform complex interdisciplinary research into compelling narratives that make our work accessible to both academic and public audiences.

The Waving Mondays initiative has been nothing short of revolutionary. Throughout 2024, we organized four live field trips to partner institutes, creating a dynamic platform for intellectual cross-pollination. These were not mere meetings, but expeditions into the landscape of interdisciplinary understanding.

I must particularly commend your exceptional organization of the fourth Waving Monday at the University Medical Centre Utrecht. The lectures on early signals in the societal domain were inspirational,

and the "lunch with a view" was a masterstroke of combining academic discourse with a stimulating environment. Your ability to create both intellectual and social space for scientific dialogue is remarkable.

I also want to specifically thank you for your mentorship of students Emilie and Anneliet. Their reports on conceptual similarities between signals across various domains are groundbreaking. They've managed to draw connections that many would have overlooked, showcasing the true potential of our interdisciplinary approach.

As we reflect on 2024, I am struck by how the Better Wave than Worry project has not just been a research initiative, but a movement towards more holistic, interconnected scientific understanding.

I would be most grateful if you could respond with your own reflections on our activities this year. Your perspective is invaluable to our continued growth and innovation.

Warmest regards,

James Vrijenhoek

30th March, 2025

James Vrijenhoek
University Medical Centre Utrecht
Department of Genetics
Better Wave than Worry Project

Dear Dr. Vrijenhoek⁸,

Your comprehensive review of the Better Wave than Worry project has been a moment of profound reflection for me. The collective vision we've cultivated, the innovative Waving Mondays, and our commitment to breaking down disciplinary silos represent a pioneering approach to understanding complex systemic challenges. I am particularly eager to elaborate on the **exceptional work of our students, Emilie and Anneliet, whose research has illuminated the intricate landscape of early warning signals across scientific domains.**

Their systematic study, involving **interviews with 20 experts**, has yielded insights that are both nuanced and transformative. By meticulously mapping considerations, barriers, and opportunities across divergent fields, Emilie and Anneliet have underscored the critical importance of interdisciplinarity in preventing what I would call "**multi-interpretable catastrophes**" - scenarios where siloed thinking can lead to catastrophic misunderstandings.

The students' findings resonate deeply with contemporary scientific discourse on complexity. They've empirically demonstrated the variability and context-dependency of early warning signals, a concept that echoes broader challenges in complex systems research. The interviews consistently highlighted

the necessity of cross-disciplinary collaboration, a theme that aligns with emerging methodological approaches in contemporary scientific inquiry.

What strikes me most is the potential for future research. The students have not merely compiled a report but have laid the groundwork for a more **integrated framework of signal identification and response.** Their comprehensive overview of signals and their metaphorical representations across domains provides a rich tapestry of interdisciplinary understanding.

Looking ahead, I see tremendous potential in expanding our research sample, **increasing diversity**, and developing a more **robust, integrated approach to early warning signal analysis.** The work of Emilie and Anneliet represents more than a research project - it's a blueprint for a more holistic scientific methodology.

I would be delighted to discuss these findings in more depth and explore how we can further develop the insights generated by our remarkable students.

Warmest regards,

Nina Doudna

EPILOGUE

RIPPLES IN THE OCEAN OF KNOWLEDGE*

My esteemed colleagues and friends,

As the final waves of our collaborative journey ebb upon the shores of conclusion, I feel compelled to put quill to parchment and express profound gratitude for your unwavering dedication to our humble consortium, "Better Wave than Worry."

To Dr. Habets, whose ethical contemplations have illuminated our path with the precision of a lighthouse guiding vessels through turbulent waters: your ability to discern moral complexities in our research has prevented us from drifting onto treacherous shoals. Your wisdom has reminded us that knowledge without virtue is as a ship without ballast, prone to capsize at the first squall of temptation.

Dr. Van der Bolt, your transition perspective has been the compass by which we have navigated the vast ocean of change. You have shown us that transformation is not merely to be endured but embraced as the natural tide that shapes the very coastline of human progress. When our courage faltered, your steady hand upon the tiller guided us through uncertain passages.

Dr. Van Steenbeek, your vigilance in detecting the subtle signals of veterinary disease has been akin to the keen eye of a seasoned mariner who perceives the distant storm clouds before others have noticed the changing wind. Your methodical observations have taught us that prevention is indeed the better part of valor, and that attentiveness to the smallest signs may spare us the greatest calamities.

Dr. Streng, in the realm of virology you have been our intrepid explorer, charting microscopic worlds with the curiosity of an ancient cartographer mapping uncharted territories. Your enthusiasm for discovery reminds us that wonder is the wellspring of all scientific endeavor, and that even the most minute entities may carry consequences of magnificent proportion.

Dr. Pirson, your ethical reflections have served as the moral sextant by which we have measured our position relative to the fixed stars of human dignity and compassion. You have taught us that though the winds of progress may fill our sails, we must always be mindful of the shores upon which our actions may eventually wash.

I must also acknowledge those whose brief sojourns with our consortium have left lasting impressions upon our collective work. Dr. Schmid, Dr. Schroër, Dr. Capodistria, and Dr. Turco – like visiting scholars from distant lands, you brought fresh perspectives that invigorated our discourse. Each of you, in your unique fashion, cast stones into our intellectual pond, creating ripples that continue to influence our thinking.

To David Redeker and Marloes ten Kate, whose workshop on Scientific Storytelling transformed our technical utterances into narratives that might resonate in the hearts and minds of the public: you have reminded us that knowledge confined to the ivory tower is as barren as seed locked in a jar, never planted. Your guidance in crafting our storytelling videos has allowed our research to take root in fertile soil beyond academic boundaries.

Finally, my heartfelt appreciation extends to the Centre for Unusual Collaboration, whose support transcends mere financial patronage. You have provided not only the grant that has sustained our material needs but also facilities that have housed our deliberations and a network that has nourished our intellectual growth. Like the roots of a mighty oak, your support has remained largely unseen, yet without it, our consortium could never have reached toward the heavens.

In closing, I am reminded of the words of our mutual inspiration, Erasmus himself, who wrote: "In the kingdom of the blind, the one-eyed man is king." Yet I would humbly amend this wisdom to suggest that in the consortium of the curious, each member contributes a unique perspective, and it is only through the combined vision of all that we truly see. Our work together proves that collaboration, like the harmony of waves upon the shore, creates a symphony more profound than any solitary note.

With deepest regard and anticipation of future discoveries,

Dr. Desiderius Vrijenhoek
Coordinator, Better Wave than Worry Consortium

**Adapted from Claude (Anthropic Software) output, based on the following prompt:
You are dr. Vrijenhoek, coordinator of the Better Wave than Worry consortium, with the writing style of Desiderius Erasmus. Write the epilogue of a collection of letters to four of the consortium members (see other chats in my Claude account for reference). In the epilogue you thank the other consortium members - dr. Habets (ethical reflection), dr. Van. der Bolt (transition perspective), dr. Van Steenbeek (signals for veterinary disease), dr. Streng (virology) and dr. Pirson (ethical reflection) for their support and input throughout the past year. You also acknowledge the contributions of dr. Schmid, dr. Schroër, dr. Capodistria and dr. Turco for the inspirational moments they provided on particular occasions. You also acknowledge David Redeker and Marloes ten Kate for their inspiring workshop Scientific Storytelling and their support in making the storytelling videos of the consortium members. Finally you thank the Centre for Unusual Collaboration for their support - not only for the grant, but also in providing facilities and network.*

