

Imaging the Biofield Initiative

Report on Phases 1 & 2

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Background

Living organisms are composed of intricate biochemical and bioelectromagnetic structures, some of which can be detected outside the body as biofields. Both traditional and modern healing practices often rely on non-physical methods to facilitate healing. Some healing practitioners report that they work with biofields, using subtle energies, intention, or other methods to facilitate healing without physical contact by interacting with or influencing a healee's biofield. According to these biofield practitioners, the biofield, which surrounds and permeates the physical body, plays a crucial role in guiding and influencing health (Hammerschlag, 2014; Matos, 2021). In order to understand the effectiveness and efficacy of biofield healing, and to advance these practices in an evidence-based manner, it is important to conduct scientific research investigating the nature of biofields and the mechanism by which they may impact healing. One critical component of this investigation is to measure biofields within and around the human body in a scientifically veritable way.

The Subtle Energy Funders Collective created the *Imaging the Biofield Initiative* to enhance awareness and scientific understanding of biofields by advancing technical and scientifically-veritable approaches for measuring and visualizing biofields within and around the human body. The initiative aims to utilize these measures to gain insights into their functional significance for health and wellness, and to communicate the results of this work with the public. Through this initiative, we hope to catalyze a new biofield-based scientific understanding that could transform the way we approach healthcare and pave the way for new diagnostic tools and treatments that are more effective, less invasive, whole person based options for alleviating pain and suffering.

Initiative Phases 1 & 2

Phases 1 and 2 of the Imaging the Biofield Initiative involved background research and development to determine the state of the science in this area and a detailed approach forward. The project team studied the literature to determine the various biofields that have the most research supporting their diagnostic or functional significance, identified open-source calibrated devices capable of measuring these biofields, and evaluated technical feasibility.

The core components of Phases 1 & 2 included:

1. Conducting Expert Working Group Meetings with 7 Global Subject Matter Experts
2. Interviewing 20+ Additional Expert Scientists
3. Performing a Semi-structured Literature Review and Analysis (>400 articles)
4. Obtaining Healer/Seer Input
5. Conducting a Collaborative Design Process w/Funders and Science Team
6. Performing Due diligence on Equipment Suppliers, Location and Teams
7. Developing and Iterated Scope of Work and Execution Plan
8. Identifying Reputable Lab to Execute Phase 3
9. Preparing A Proposal for a Pilot Project in Phase 3

The results of this Phases 1 & 2 are presented below.

Scoping the Field

Extensive efforts were made to evaluate the current state of the science for measuring biofields. A targeted scoping of the scientific literature was carried out, which was supplemented by 25 expert interviews and supported by input from an expert working group, as well as consultation with biofield practitioners. The assessed biofields were broadly categorized from gross in nature to subtle in nature, as illustrated in Figure 1. These fields ranged from physiological and biochemical measurements within the body, to electric currents and electrophysiology on the body, to electric and magnetic fields, sound, light, extended electrodynamics, and quantum processes off the body.

Scientific evidence for off the body biofield measurements

Over 400 scientific papers were collected by consulting with experts and performing targeted searches of peer-reviewed published literature. While the scoping process was not systematic, it was extensive. Figure 1 is an overview of the number of papers identified and reviewed, organized by type of biofield measurement. Three researchers initially assessed each paper to determine: the type of biofield measurement, whether any diagnostic or treatment properties were related to the biofield measurement, and whether actual imaging of the biofield was presented in the papers. The results highlight that there is very limited scientific evidence of off the body measurements of human biofields. Measurements with diagnostic value are restricted to a few papers related to the cardiac field, infrared measurements, and ultra-weak biophoton measurements. Images of these measurements with diagnostic value have been reported in only 8 papers identified through this scoping effort.

The project team used this scoping process, the discussions with experts, and meetings with the working group to identify the most promising types of biofields for achieving scientifically accurate and meaningful off-the-body measurements and visualizations. The measures identified were as follows:

1. Ultraweak Biophoton Emissions - Biophoton intensity measurements taken over the entire upper body with a CCD camera, and more detailed biofield emission pattern measurements taken from the front and back of each hand with photomultiplier tubes (PMTs).
2. Magnetic fields - (extremely low frequency) TwinLeaf Labs 9-sensor magnetometer array and data platform to measure dynamic magnetic fields emanating from the cardiac region.
3. Long Wavelength Infrared - Infrared measurements of the face during all experiments.
4. Local Entropy - High-sensor density quantum number generator (RNG) array to measure the head and full torso to potentially identify quantum entropy around local regions of the body.

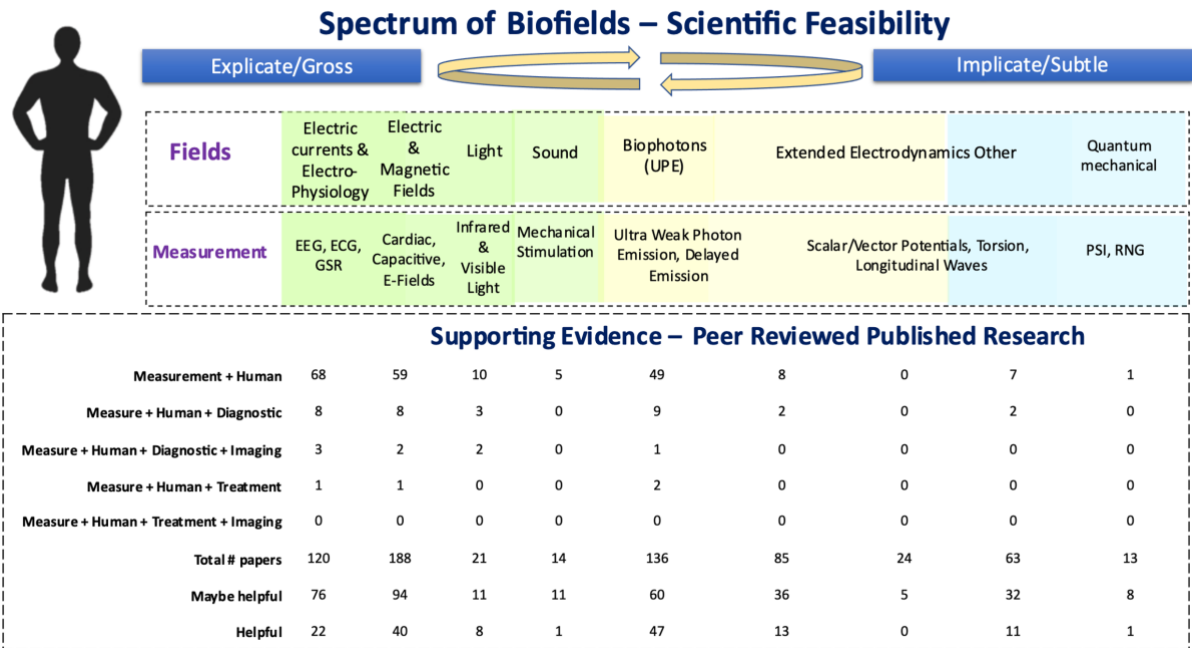


Figure 1

Studies Recommended for Replication

After reviewing the literature, the team identified several key studies to recommend for replication. Confirming the findings of these studies could significantly advance our understanding of biofields.

Alabdulgader A, McCraty R, Atkinson M, et al. Long-Term Study of Heart Rate Variability Responses to Changes in the Solar and Geomagnetic Environment. *Sci Rep.* 2018;8(1):2663. Published 2018 Feb 8. doi:10.1038/s41598-018-20932-x

Abstract: This long-term study examined relationships between solar and magnetic factors and the time course and lags of autonomic nervous system (ANS) responses to changes in solar and geomagnetic activity. Heart rate variability (HRV) was recorded for 72 consecutive hours each week over a five-month period in 16 participants in order to examine ANS responses during normal background environmental periods. HRV measures were correlated with solar and geomagnetic variables using multivariate linear regression analysis with Bonferroni corrections for multiple comparisons after removing circadian influences from both datasets. Overall, the study confirms that daily ANS activity responds to changes in geomagnetic and solar activity during periods of normal undisturbed activity and it is initiated at different times after the changes in the various environmental factors and persist over varying time periods. Increase in solar wind intensity was correlated with increases in heart rate, which we interpret as a biological stress response. Increase in cosmic rays, solar radio flux, and Schumann resonance power was all associated with increased HRV and parasympathetic activity. The findings support the hypothesis that energetic environmental phenomena affect psychophysical processes that can affect people in different ways depending on their sensitivity, health status and capacity for self-regulation.

PDF: [Long-Term Study of Heart Rate Variability Responses to Changes in the Solar and Geomagnetic Environment \(nih.gov\)](https://www.nih.gov/pubs/pub/long-term-study-of-heart-rate-variability-responses-to-changes-in-the-solar-and-geomagnetic-environment)

Elhalel G, Price C, Fixler D, Shainberg A. Cardioprotection from stress conditions by weak magnetic fields in the Schumann Resonance band. *Sci Rep.* 2019;9(1):1645. Published 2019 Feb 7. doi:10.1038/s41598-018-36341-z

Abstract: The Schumann Resonances (ScR) are Extremely Low Frequency (ELF) electromagnetic resonances in the Earth-ionosphere cavity excited by global lightning discharges. This natural electromagnetic noise has likely existed on the Earth ever since the Earth had an atmosphere and an ionosphere, hence surrounding us throughout our evolutionary history. The purpose of this study was to examine the influence of extremely weak magnetic fields in the ScR first mode frequency range on the spontaneous contractions, calcium transients and Creatine Kinase (CK) release of rat cardiac cell cultures. We show that applying 7.8 Hz, 90 nT magnetic fields (MF) causes a gradual decrease in the spontaneous calcium transients' amplitude, reaching 28% of the initial amplitude after 40 minutes of MF application, and accompanied with a gradual decrease in the calcium transients' rise time. The mechanical spontaneous contractions cease after the ScR fields have been applied for more than 30 minutes, when the calcium transient's amplitude reached ~60% of its initial value. The influence of the ScR MF was reversible, independent of the field magnitude in the range 20 pT-100 nT, and independent of the external DC magnetic field. However, the effect is frequency dependent; the described changes occurred only in the 7.6-8 Hz range. In addition, applying 7.8 Hz, 90 nT MF for 1.5 hours, reduced the amount of CK released to the buffer, during normal conditions, hypoxic conditions and oxidative stress induced by 80 μ M H₂O₂. We show that the ScR field induced reduction in CK release is associated with a stress response process and has a protective character.

PDF: [Cardioprotection from stress conditions by weak magnetic fields in the Schumann Resonance band \(nih.gov\)](#)

Fels D. Endogenous physical regulation of population density in the freshwater protozoan *Paramecium caudatum*. *Sci Rep.* 2017;7(1):13800. Published 2017 Oct 23. doi:10.1038/s41598-017-14231-0

Abstract: Studies confirm physical long-range cell-cell communication, most evidently based on electromagnetic fields. Effects concern induction or inhibition of cell growth. Their natural function is unclear. With the protozoan *Paramecium caudatum* I tested whether the signals regulate cell density and are electromagnetic. Up to 300 cells/mL, cell growth in clones of this study is decreasingly pronounced. Using cuvettes as chemical barriers enabling physical communication I placed 5 indicator cells/mL, the inducer populations, into smaller cuvettes that stand in bigger and contained 50, 100, 200 or 300 cells/mL. Under conditions of total darkness such pairs were mutually exposed for 48 hours. The hypothesis was that indicator cells, too, grow less the more neighbor cells there are. The bigger inducer populations were in the beginning the less they grew. The indicator populations grew accordingly; the more cells they were surrounded by the less they grew. The suppressing neighbors-effect disappeared when inner cuvettes were shielded by graphite known to shield electromagnetic radiation from GHz to PHz, i.e. to absorb energy from microwaves to light. These are the first results demonstrating non-contact physical quorum sensing for cell population density regulation. I assume rules intrinsic to electromagnetic fields interacting with matter and life.

PDF: [Endogenous physical regulation of population density in the freshwater protozoan *Paramecium caudatum* \(nih.gov\)](#)

Green EE, Parks PA, Guyer PM, Fahrion SL, Coyn L. Anomalous Electrostatic Phenomena in Exceptional Subjects. *Subtle Energies*. 1991;2:3):69-94.

Abstract: A Tibetan meditation system reported in 1882 suggested a way to facilitate self-awareness by isolating students from electrical ground while they sat beneath a bar magnet and looked at their image in a polished copper wall. The research question: Does an electrostatic charge build up on electrically-isolated meditators?

This question was tested with 10 "regular" subjects (typical meditators) and 9 "exceptional" subjects (experienced Non-Contact Therapeutic Touch (NCTT) therapists) in a Copper Wall Lab designed to isolate the subject from ground and also isolate, individually, four surrounding copper walls, front, back, up, and down. For detection of electrostatic potential, the subject's body and the four walls were individually "floated" on single-ended electrometer inputs. A pair of video cameras guarded against body-motion artifact.

In 45-minute meditation sessions with the 10 regular meditators, no body-potential surges reached 4 v. In comparison, in comparable meditation sessions with the NCTT meditators, many body-potential surges greater than 4 v were found. Surges appearing in the records of NCTT meditators ranged from 4 v to 221 v (median 8.3 v), with surge duration ranging from 0.5 s to 12.5 s (median = 3.6 s).

During NCTT therapy sessions with patients, NCTT therapists produced body-potential surges ranging from 4 v to 190 v. The majority of surges were of negative polarity. Though there is a long tradition of Non-Contact Therapeutic Touch in both folklore and in religion, there are as yet no known psychophysiologic or biophysical explanations for such large-magnitude electrical phenomena, 10³ times greater than large psychophysiologic skin-potential (GSP) changes related to emotional responses, 10⁵ larger than EKG voltages, and 10⁶ larger than EEG voltages. Since focus-of-attention by NCTT therapists is often a correlate factor in this anomalous phenomenon, results suggest the presence of previously-unmeasured human potential, as well as body potential.

Various schemes are discussed for analysis of body-potential surge data, with an eye to determining body mechanisms that might be capable of generating electrostatic charge.

PDF: [Anomalous Electrostatic Phenomena in Exceptional Subjects](#)

Moga M. Magnetic field activity during psychic healing: A preliminary study with Healing Touch practitioners. *Journal of Nonlocality*. 2014;3(1).

Abstract: Psychic healing, involving the paranormal abilities of healers, has re-invented itself in the cultural mainstream as "energy medicine". Energy medicine 'biofield therapies' such as Reiki, Qigong, and Healing Touch are administered by a healer who clears, balances and replenishes 'life-energy', sometimes with the assistance of nonphysical 'guides'. A small number of studies have noted electric field surges and magnetic field (MF) oscillations in close proximity to the healers' body, suggesting that electromagnetic field variations may be part of the energy healing mechanism. In the present study, I examine whether MF oscillations are present during Healing Touch (HT), an energy-based, biofield therapy. Low-frequency (0 - 40 Hz) MF activity was measured continuously with Hall-type gaussmeters in close proximity to healer-client pairs during HT sessions. MF activity observed during each HT session was compared with pre-session and post-session MF activity, and with MF

activity during guided progressive relaxation (GPR) sessions without a healer and during mock HT sessions without a client. Qualitative analysis was used to identify potential relationships between MF activity, client symptoms, and healer descriptions of the client's biofield. Low-frequency MF oscillations were observed during 24 of 26 HT sessions, and 14 of 16 GPR sessions. The amplitude of the MF oscillations (Bpeak-to-peak) was significantly greater during the HT session and post-session periods, as compared to the pre-session period. Bpeak-peak showed no significant change across the GPR time periods. Large-amplitude MF oscillations > 1.0 milliGauss during HT were associated with healer/client qualitative reports of emotional release and clearing of the biofield. MF oscillations in the GPR sessions were typically low-amplitude, with 55% of oscillations occurring in the first 20 minutes of the session. Based on comments from the participants, the MF oscillations during the first 20 minutes of GPR may represent physical releases, as this part of the guided meditation focused on releasing tension in different muscle groups. Low-amplitude MF oscillations in the HT sessions showed some association with physical releases and pain reduction. MF activity was extremely quiet during the mock HT sessions, particularly in cases where the HT practitioner reported being "heart-centered". The results suggest that low-frequency MF activity may reflect the emotions and biofield qualities of the participants. Continuous recording of environmental variables, such as magnetic field activity, may be useful in the study of paranormal phenomena, such as psychic healing, psychokinesis, and remote viewing.

PDF: [View of Magnetic field activity during psychic healing: A preliminary study with Healing Touch practitioners](#)

Van Wijk, R., Ackerman, J. M., & Van Wijk, E. P. A. (2006). Effects of a color filter used in auriculomedicine on ultraweak photon emission of the human body. *Journal of Alternative and Complementary Medicine*, 12(10), 955–962. <https://doi.org/10.1089/acm.2006.12.955>

Context: The human body emits ultraweak photons. It has been demonstrated that feedback regulation of ultraweak photon emission from the hand is detectable utilizing gelatin color filters in complete darkness. Color filters are commonly utilized in auriculomedicine diagnostic procedures based on the radial artery vascular autonomic signal.

Objective: To evaluate the possibility of an effect by a dark-adapted red filter on (1) local ultraweak human photon emission using different anatomic locations, and (2) on systemic photon emission using one location for red filter exposure and another for photon emission recording.

Design: Photon emission of abdomen, forehead, palm, and dorsum of the hand was recorded before and after the presence of a red filter. In addition, photon emission of forehead and dorsum of the hand was recorded before, during, and after the presence of the red filter close to the palm. In both instances, the filter was dark-adapted and placed in close proximity to, but not touching the skin of the dark-adapted subject. A low-noise, end window photomultiplier for recording ultraviolet and visible (200-650 nm) photon emission (with a very low background count rate) and designed for manipulation in three directions was situated in a dark room. The technology was utilized to record spontaneous photon emission of the abdomen, forehead, palm, and dorsum of the hand of one human male subject.

Results: Data demonstrate that a dark-adapted subject responds in the total absence of light with a temporary increase in photon emission from the anatomic locations that had been exposed for 200 s at a distance of 3 cm to a dark-adapted red filter. Data from sequential time series suggest red filter initiation of a refractory emission reaction. Exposure of the palm to the red filter also evokes photon

emission from the dorsum of the same hand and from the forehead. This response could be registered immediately after the beginning of the exposure. The stimulated emission is followed by a slow decrease of emission in the period after exposure to the filter.

Conclusion: Data suggest that red filter-stimulated photon emission response is systemic and rapid. Data imply an exchange of information vis-à-vis light from both hand and red filter. The mechanism of such interaction is currently speculation only.

PDF (for purchase): [Effects of a Color Filter Used in Auriculomedicine on Ultraweak Photon Emission of the Human Body](#)

Van Wijk EP, Ackerman J, Van Wijk R. Effect of meditation on ultraweak photon emission from hands and forehead. *Forsch Komplementarmed Klass Naturheilkd.* 2005;12(2):107-112. doi:10.1159/000084028

Background: Various physiologic and biochemical shifts can follow meditation. Meditation has been implicated in impacting free radical activity. Ultraweak photon emission (UPE, biophoton emission) is a constituent of the metabolic processes in a living system. Spectral analysis showed the characteristics of radical reactions.

Objectives: Recording and analysing photon emission in 5 subjects before, during and after meditation.

Methods: UPE in 5 subjects who meditated in sitting or supine positions was recorded in a darkroom utilising a photomultiplier designed for manipulation in three directions.

Results: Data indicated that UPE changes after meditation. In 1 subject with high pre-meditation values, UPE decreased during meditation and remained low in the post meditation phase. In the other subjects, only a slight decrease in photon emission was found, but commonly a decrease was observed in the kurtosis and skewness values of the photon count distribution. A second set of data on photon emission from the hands before and after meditation was collected from 2 subjects. These data were characterised by the Fano factor, $F(T)$, i.e. variance over mean of the number of photoelectrons observed within observation time T . All data were compared to surrogate data sets which were constructed by random shuffling of the data sets. In the pre-meditation period, $F(T)$ increased with observation time, significantly at time windows >6 s. No such effect was found after meditation, when $F(T)$ was in the range of the surrogate data set.

Conclusions: The data support the hypothesis that human photon emission can be influenced by meditation. Data from time series recordings suggest that this non-invasive tool for monitoring radical reactions during meditation is useful to characterise the effect of meditation. Fano factor analysis demonstrated that the time series before meditation do not represent a simple Poisson process. Instead, UPE has characteristics of a fractal process, showing long-range correlations. The effect of meditation waives out this coherence phenomenon, suggesting a weaker and less ordered structure of UPE. In general, meditation seems to influence the complex interactions of oxidative and anti-oxidative reactions which regulate photon emission. The reason for the statistical changes between pre- and post-meditation measurements remains unclear and demands further examination.

PDF (for purchase): [Effect of Meditation on Ultraweak Photon Emission from Hands and Forehead](#)

Wackermann J, Seiter C, Keibel H, Walach H. Correlations between brain electrical activities of two spatially separated human subjects. *Neurosci Lett.* 2003;336(1):60-64. doi:10.1016/s0304-3940(02)01248-x

Abstract: Six channels electroencephalogram (EEG) were recorded simultaneously from pairs of separated human subjects in two acoustically and electromagnetically shielded rooms. While brain electric responses to visual pattern-reversal stimuli were elicited in one subject, the other subject relaxed without stimulation. EEGs of both subjects were averaged at times of stimulus onset, effective voltage of the averaged signals was computed within a running window, and expressed as ratio (Q) to the effective voltage of averaged EEG signal from non-stimulation periods. These ratios in non-stimulated subjects at the latency of the maximum response in stimulated subjects were analysed. Significant departures of Q ratios from reference distributions, based on baseline EEG in non-stimulation periods, were found in most non-stimulated subjects. The results indicate that correlations between brain activities of two separated subjects may occur, although no biophysical mechanism is known.

PDF (for purchase): [Correlations between brain electrical activities of two spatially separated human subjects - ScienceDirect](#)

Narratives

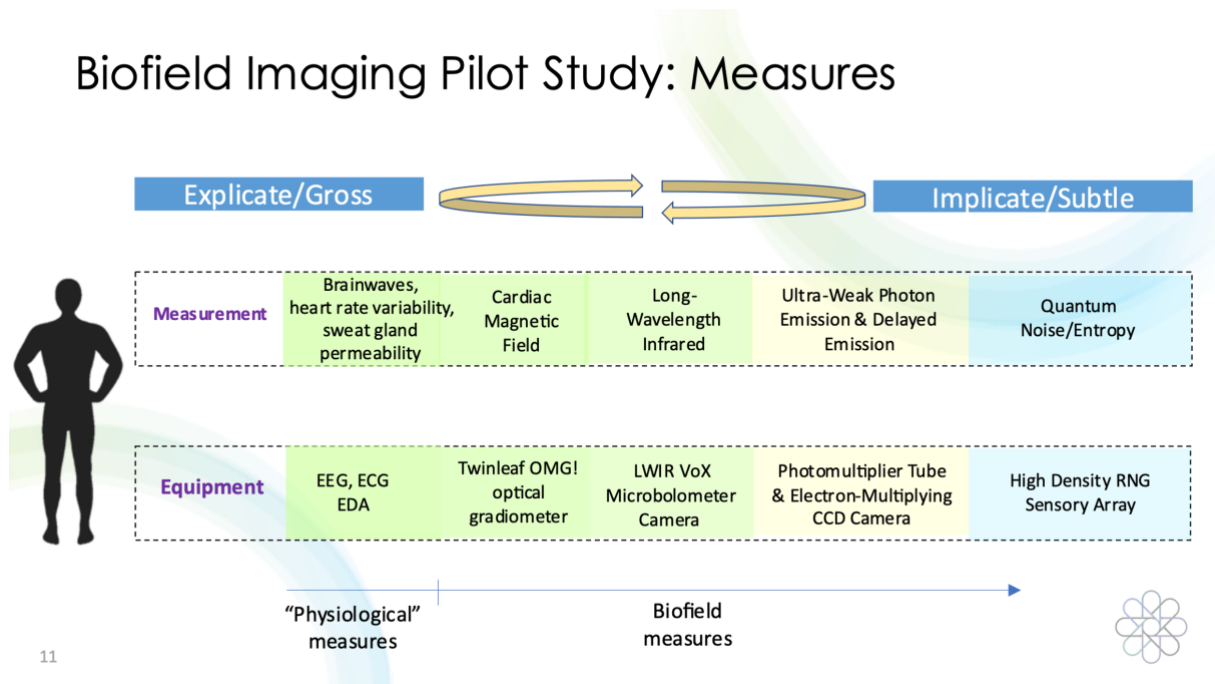
The project team identified a number of hypothetical narratives that results from the Imaging the Biofield Initiative have the potential to demonstrate to the mainstream public. These narratives would convey clear messages about the nature and importance of biofields. The narratives are the result of a focus group session with members of the Subtle Energy Funders Collective, a select group of scientists from the working group, and several media communications experts. Each of the narratives builds on the previous one. The narratives are:

1. There are scientifically measurable energy fields emanating from the human body.
2. Each person's energy fields are unique and dynamic; meditators and healers may exhibit exceptional biofield activity.
3. Energy fields in and around the human body are affected by a person's environment, including proximity to another person.
4. Energy fields in and around the human body contain dynamic information related to health and wellbeing.
5. Different fields emanating from the human body are coordinated with each other in a way that conveys diagnostic and regulatory information.
6. Biofields are correlated to key physiological measures.
7. Human biofields are impacted by mental and physical stressors, meditation and breathing, emotional states, certain sounds, and electromagnetic stimuli.
8. Energy fields of biofield healing practitioners change during their practice of biofield healing.
9. Energy fields in and around a healee's body change during a biofield healing.
10. Reduction in quantum noise (indicating an increase in order) occurs locally around the body in a way that is related to health and wellness, including to homeostatic emotional states.

Imaging the Biofield Phase 3 Pilot Study Proposal

Based on the background scoping and development work in Phase 1 & 2, the project team proposed a detailed plan for a Phase 3 pilot study to measure and visualize multiple human biofields in a scientifically verifiable way. The proposal recommends measuring and visualizing biofields from a population of healthy people as well as participants with generalized anxiety disorder. The biofield measures recommended were based on the results identified above as well as the feasibility of conducting the measures simultaneously in a laboratory setting. Extensive discussions resulted in choosing the combination of ultra-weak photon emission, local entropy, cardiac magnetic field, and long wavelength infrared measurements. Data resulting from these measurements will be correlated with data from a set of physiological measurements consisting of EEG, ECG, sweat gland permeability, and respiration measurements.

Biofield Imaging Pilot Study: Measures



Baseline measurements will be taken to establish the initial state of the biofield. The effects of different cognitive, social, and physical stressors on the person's biofield and physiological measures will be investigated. Furthermore, the impact of affective emotions such as love and disgust will be measured, along with the effects of breathing exercises and meditation.

Another series of experiments will focus on measuring a healee before, during, and after conducting a healing session. All of the gathered data will be thoroughly collected, analyzed, and transformed into visualizations to depict changes in biofield measures during the different experiments and interventions.

Expected outcomes of phase 3 are:

1. Develop Protocol for and Successfully Conduct Simultaneous Measures of 4 Human Biofields: Successfully set up an array of biofield measuring equipment to simultaneously measure four different energy fields emanating from the human body (see "Biofields to Be Measured" below), focusing on the head and upper body region.
2. Begin to Establish Baseline Measures for Human Biofields: With the array of equipment, measure the biofields of healthy adults to establish baseline biofield emanations.

3. Run Battery of Pilot Experiments to Test Hypothesized Behaviors and Functional Significance of Measured Biofields: Pilot test a series of stimulus experiments, and biofield healings, with the biofield measuring equipment designed to begin to validate hypotheses about the existence, behavior and significance of human biofields.
4. Create Initial 2D Static Visualizations and Dynamic Video Visualizations of Biofields around Upper Body: Convert measurement data into a number of 2D static visualizations and 3D video visualizations, expected to be composites of the four measured fields, demonstrating dynamic variations over time in biofield behaviors observed during stimulus experiments, as well as correlations between the different measures. (see "Visualizations of Biofields" below).
5. Prepare Scientific Report of Pilot Findings, Including Effect Sizes and Standardized Protocols for Creating Visualizations: Create report from this pilot phase on consistency and variability in the different types of biofields between and within humans, and as they relate to experimental hypotheses, and protocols established.
6. Deliver a Proposal for Phase 4: Recommend follow-up work to validate statistical significance of promising results from Phase 3, to further advance visualizations of biofields, and to explore other promising hypotheses.