In TGD Universe the moments of consciousness are associated with quantum jumps between quantum histories. The proposal is that the dynamics of consciousness is governed by Negentropy Maximization Principle (NMP), which states the information content of conscious experience is maximal. The formulation of NMP is the basic topic of this chapter.

NMP codes for the dynamics of standard state function reduction and states that the state function reduction process following U-process gives rise to a maximal reduction of entanglement entropy at each step. In the generic case this implies at each step a decomposition of the system to unique unentangled subsystems and the process repeats itself for these subsystems. The process stops when the resulting subsystem cannot be decomposed to a pair of free systems since energy conservation makes the reduction of entanglement kinematically impossible in the case of bound states. The natural assumption is that self loses consciousness when it entangles via bound state entanglement.

There is an important exception to this vision based on ordinary Shannon entropy. There exists an infinite hierarchy of number theoretical entropies making sense for rational or even algebraic entanglement probabilities. In this case the entanglement negentropy can be negative so that NMP favors the generation of negentropic entanglement (NE), which is not bound state entanglement in standard sense since the condition that state function reduction leads to an eigenstate of density matrix requires the final state density matrix to be a projection operator.

NE might serve as a correlate for emotions like love and experience of understanding. The reduction of ordinary entanglement entropy to random final state implies second law at the level of ensemble. For the generation of NE the outcome of the reduction is not random: the prediction is that second law is not a universal truth holding true in all scales. Since number theoretic entropies are natural in the

intersection of real and
p-adic worlds, this suggests that life resides in this intersection. The existence
effectively bound states with no binding energy might have important implications for
the understanding the stability of basic bio-polymers and the key aspects of metabolism.
A natural assumption is that self experiences expansion of consciousness as it entangles
in this manner. Quite generally, an infinite self hierarchy with the entire Universe at
the top is predicted.

There are two options to consider. Strong form of NMP, which would demand maximal
negentropy gain: this would not allow morally responsible free will if ethics is defined
in terms of evolution as increase of NE resources. Weak form of NMP would allow self to
choose also lower-dimensional sub-space of the projector defining the final state
sub-space for strong form of NMP. Weak form turns out to have several highly desirable
consequences: it favours dimensions of final state space coming as powers of prime, and in
particular dimensions which are primes near powers of prime: as a special case, p-adic
length scale hypothesis follows. Weak form of NMP allows also quantum computations, which
halt unlike strong form of NMP.

Besides number theoretic negentropies there are also other new elements as compared to the
earlier formulation of NMP.

\begin{enumerate}

\item ZEO modifies dramatically the formulation of NMP since U-matrix
acts between zero energy states and can be regarded as a collection of orthonormal
M-matrices, which generalize the ordinary S-matrix and define what might be called a
complex square root of density matrix so that kind of a square root of thermodynamics at
single particle level justifying also p-adic mass calculations based on p-adic
thermodynamics is in question.

\item The hierarchy of Planck constants labelling a hierarchy of quantum criticalities

is a further new element having important implications for conciousness and biology.

\item Hyper-finite factors of type II$_1$ represent an additional technical complication
requiring separate treatment of NMP taking into account finite measurement resolution
realized in terms of inclusions of these factors. \end{enumerate}

NMP has wide range of important implications.

\begin{enumerate}

\item In particular, one must give up the standard view about second law and replace it
with NMP taking into account the hierarchy of CDs assigned with ZEO and dark matter
hierarchy labelled by the values of Planck constants, as well as the effects due to NE.
The breaking of second law in standard sense is expected to take place and be crucial
for the understanding of evolution.

\item Self hierarchy having the hierarchy of CDs as imbedding space correlate leads
naturally to a description of the contents of consciousness analogous to thermodynamics
except that the entropy is replaced with negentropy.

\item In the case of living matter NMP allows to understand the origin of metabolism. NMP
demands that self generates somehow negentropy: otherwise a state function reduction to
tjhe opposite boundary of CD takes place and means death and re-incarnation of self.
Metabolism as gathering of nutrients, which by definition carry NE is the manner to avoid
this fate. This leads to a vision about the role of NE   in the generation of sensory
qualia and a connection with metabolism. Metabolites would carry NE and each metabolite
would correspond to a particular qualia (not only energy but also other quantum numbers
would correspond to metabolites). That primary qualia would be associated with nutrient
flow is not actually surprising!

\item NE leads to a vision about cognition. Negentropically entangled state consisting of a superposition of pairs can be interpreted as a
conscious abstraction or rule: negentropically entangled Schr\"odinger cat knows that it

is better to keep the bottle closed.

\item NMP implies continual generation of NE. One might refer to this ever expanding
universal library as \blockquote{Akaschic records}. NE could be experienced directly
during the repeated state function reductions to the passive boundary of CD - that is
during the life cycle of sub-self defining the mental image. Another, less feasible option
is that interaction free measurement is required to assign to NE conscious experience. As
mentioned, qualia characterizing the metabolite carrying the NE could characterize this
conscious experience.

\item A connection with fuzzy qubits and quantum groups with NE is highly suggestive. The
implications are highly non-trivial also for quantum computation allowed by weak form of
NMP since NE is by definition stable and lasts the lifetime of self in question.

\end{enumerate}